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# Bus Transportation

## INDEX TO VOLUME II

*January to December, 1923*

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## Instruction for Use of Index

THIS index is essentially a subject index, not an index of titles. Articles treating a number of different subjects are indexed under each of them. Wherever the article relates to any particular transportation company or to matters applying to a particular city or state, a geographical reference is made. Groupings are made under the name of the city in which the main office is located. City, state or foreign affairs appear under the names of the city or state or foreign country involved.

References to the activities of associations closely allied to the bus transportation industry are given under the names of the various organizations. Proceedings of

other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shops and equipment" and are not indexed alphabetically.

In the subject index, if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen groups, but the group headings, shown in capital letters, do not appear in the index unless, like "Fares," they appear also in the small type.

### *Classified List of Keywords*

<b>ACCIDENTS AND ACCIDENT PREVENTION</b>		<b>LEGAL</b>		<b>STRUCTURES</b>	
Accidents	Safety work	Franchises	Legal	Garages	
		Regulation	Taxes	Overhead contact system	
<b>EQUIPMENT OF BUSES</b>		<b>MAINTENANCE</b>		Repair shops and equipment	
Axles	Body Brakes	Inspection of buses		Terminals and waiting stations	
Chassis	Engine	Lubrication		<b>TRAFFIC AND TRANSPORTATION</b>	
Electrical equipment		Maintenance practice		Application	
Standardization		Purchases and stores		Competitive relations	
Tires		Repair shops and equipment		Freight and express	
Transmission (gearset)		Road service		Merchandising transportation	
Wheels		Tests of buses and equipment		Publicity	
<b>FARES</b>		<b>MISCELLANEOUS</b>		Public, Relations with	
Fare collection		Book reviews		Schedules and time-tables	
(including apparatus)				Traffic investigations	
Fares				Traffic records	
<b>FINANCIAL AND STATISTICS</b>		<b>OPERATION</b>		Traffic signals	
Accounting		Accounting		<b>TYPES OF VEHICLES</b>	
Financial		Advertising		Electric storage battery buses	
Market conditions		Combinations of operators		Gasoline electric buses	
Statistics	Taxes	Fuels, and fuel economy		Motor buses	
<b>HIGHWAYS</b>		Insurance		Service trucks	
Highways		Record forms		Steam driven buses	
Maps of bus routes		Taxes		Trolley buses	
Paving		<b>PERSONNEL</b>			
Snow removal	Traffic signals	Employees	Wages		

# INDEX TO VOLUME 2

January	1-60
February	61-114
March	115-166
April	167-214
May	215-264
June	265-314
July	315-362
August	363-410
September	411-458
October	459-506
November	507-554
December	555-602

## A

- Aberdeen Motor Transit Co.  
Operation started, 207
- Accidents:
  - Automobile accidents, 104
  - Carelessness. Comments on, 286
  - Collision in Seattle, Wash., 105
  - Overturned bus, \*272
- Accounting:
  - Basis for fares. Comments on, 287
  - Classification in California, 310
  - Classification in Providence, 173
  - Classification in Youngstown, 175
  - Classification of A E R A A, 526
  - Determining cost (Reader), \*310
  - Forms useful, [Swint], \*576
  - Gross items only, 215
  - Standardized method needed. Comments on, 138; [Swint], 289
- Advertising (see also Publicity):
  - Illinois Bus Ass'n, 210
  - Methods used in Newburgh, N. Y., \*329
  - Terminal maintained by, 563
- Air Service. Comments on Difficulties, 581
- Akron, O.:
  - Bus discussed, 46
  - Bus operation ordinance, 57
  - Northern Ohio Traction & Light Co.:  
Bus operation [Blum], \*99  
Cost analysis, 55
- Alaska:
  - Place for buses, 531
- Albany, N. Y.:
  - Woodlawn Improvement Association & Transportation Co.:  
Fare increase, 159  
Receivership, 210
- Aldrich, W. M. (see Syracuse, N. Y.)
- Alliance, O.:
  - Cox Transportation Co.:  
Receivership, 159
- Allied Bus Association:
  - Organization, 478, 494
- American Association of State Highway Officials:
  - Office in Washington, 147
- American Electric Railway Association:
  - Bus exhibits at convention, 457, \*519  
Comments on, 532
- American Good Roads Congress:
  - Thirtieth congress:  
Program, 48
- American Road Builders Ass'n.:
  - Officers nominated, 151
- Amsterdam, N. Y.:
  - Bus line to Ballston, N. Y., 108
- Applications:
  - Analysis of future, \*320; Comments on, 339
  - Ball game special, 306
  - Buses operate with railways flooded, \*514
  - Buses replace New Jersey railways, \*411  
Comments on, 436
  - Chicago traffic [Ritchie], 352, 383; Comments on, 388
  - City service:
    - Brattleboro, Vt., 550  
Comments on, 19
    - Everett, Wash., \*459
    - Middletown, Ohio, \*215
    - Newburgh, N. Y., \*103, 257, 469, 533
    - Small cities [Taylor], c535
    - Streator, Ill., 595
  - Community bus line in East York, Pa., 515
  - Co-ordination advocated [Harding], 352; Comments on, 338
  - Co-ordination with rail facilities, 82  
[Emmons], 238; [Kennedy], 253; [Lane], 288; [Reeves], 527; Discussed by A E R A, 526
  - Development in 1922, 10; Comments on, 3
  - Discussed by U. S. Chamber of Commerce, 58
  - Far East development [Irvine], 147
  - Field for company operations [Jackson], 12
  - Field for trolley-bus [Quince], 203
  - Field of individual operator [Jackson], 121
  - Free service from parking space, 26
  - Growth, Causes of [Bollum], 251
  - Growth of bus operation by railways, 182  
Comments on, 43
  - High-grade coach service [Stedy], 96
  - Metropolitan service compared, \*23
  - Open air riding, Comments on, 241
  - Outlying section of Detroit, \*223
  - Pacific Electric Ry., \*229
  - Printing company buys bus, 271
  - Problems of motor industry, 351
  - Railways' activities, 353, 402, 448, 482, 495  
\*545, 593; Comments on, 186
  - Recognition abroad, 447
  - Relief of motor trucks to railroad [Barnes], 146
  - School buses in Tennessee, 420
  - Sleeping service announced, 594
  - Stages and buses, Comments on, 89

## B

- Semi-trailers, 1935-1936, 347  
 —Trailers, 1935-1936, 347  
 —Trucks, 1935-1936, 347  
 —Trucks, 1937-1938, 347  
 —Trucks, 1939-1940, 347  
 —Trucks, 1941-1942, 347  
 —Trucks, 1943-1944, 347  
 —Trucks, 1945-1946, 347  
 —Trucks, 1947-1948, 347  
 —Trucks, 1949-1950, 347  
 —Trucks, 1951-1952, 347  
 —Trucks, 1953-1954, 347  
 —Trucks, 1955-1956, 347  
 —Trucks, 1957-1958, 347  
 —Trucks, 1959-1960, 347  
 —Trucks, 1961-1962, 347  
 —Trucks, 1963-1964, 347  
 —Trucks, 1965-1966, 347  
 —Trucks, 1967-1968, 347  
 —Trucks, 1969-1970, 347  
 —Trucks, 1971-1972, 347  
 —Trucks, 1973-1974, 347  
 —Trucks, 1975-1976, 347  
 —Trucks, 1977-1978, 347  
 —Trucks, 1979-1980, 347  
 —Trucks, 1981-1982, 347  
 —Trucks, 1983-1984, 347  
 —Trucks, 1985-1986, 347  
 —Trucks, 1987-1988, 347  
 —Trucks, 1989-1990, 347  
 —Trucks, 1991-1992, 347  
 —Trucks, 1993-1994, 347  
 —Trucks, 1995-1996, 347  
 —Trucks, 1997-1998, 347  
 —Trucks, 1999-2000, 347  
 —Trucks, 2001-2002, 347  
 —Trucks, 2003-2004, 347  
 —Trucks, 2005-2006, 347  
 —Trucks, 2007-2008, 347  
 —Trucks, 2009-2010, 347  
 —Trucks, 2011-2012, 347  
 —Trucks, 2013-2014, 347  
 —Trucks, 2015-2016, 347  
 —Trucks, 2017-2018, 347  
 —Trucks, 2019-2020, 347  
 —Trucks, 2021-2022, 347  
 —Trucks, 2023-2024, 347  
 —Trucks, 2025-2026, 347  
 —Trucks, 2027-2028, 347  
 —Trucks, 2029-2030, 347  
 —Trucks, 2031-2032, 347  
 —Trucks, 2033-2034, 347  
 —Trucks, 2035-2036, 347  
 —Trucks, 2037-2038, 347  
 —Trucks, 2039-2040, 347  
 —Trucks, 2041-2042, 347  
 —Trucks, 2043-2044, 347  
 —Trucks, 2045-2046, 347  
 —Trucks, 2047-2048, 347  
 —Trucks, 2049-2050, 347  
 —Trucks, 2051-2052, 347  
 —Trucks, 2053-2054, 347  
 —Trucks, 2055-2056, 347  
 —Trucks, 2057-2058, 347  
 —Trucks, 2059-2060, 347  
 —Trucks, 2061-2062, 347  
 —Trucks, 2063-2064, 347  
 —Trucks, 2065-2066, 347  
 —Trucks, 2067-2068, 347  
 —Trucks, 2069-2070, 347  
 —Trucks, 2071-2072, 347  
 —Trucks, 2073-2074, 347  
 —Trucks, 2075-2076, 347  
 —Trucks, 2077-2078, 347  
 —Trucks, 2079-2080, 347  
 —Trucks, 2081-2082, 347  
 —Trucks, 2083-2084, 347  
 —Trucks, 2085-2086, 347  
 —Trucks, 2087-2088, 347  
 —Trucks, 2089-2090, 347  
 —Trucks, 2091-2092, 347  
 —Trucks, 2093-2094, 347  
 —Trucks, 2095-2096, 347  
 —Trucks, 2097-2098, 347  
 —Trucks, 2099-2100, 347  
 —Trucks, 2101-2102, 347  
 —Trucks, 2103-2104, 347  
 —Trucks, 2105-2106, 347  
 —Trucks, 2107-2108, 347  
 —Trucks, 2109-2110, 347  
 —Trucks, 2111-2112, 347  
 —Trucks, 2113-2114, 347  
 —Trucks, 2115-2116, 347  
 —Trucks, 2117-2118, 347  
 —Trucks, 2119-2120, 347  
 —Trucks, 2121-2122, 347  
 —Trucks, 2123-2124, 347  
 —Trucks, 2125-2126, 347  
 —Trucks, 2127-2128, 347  
 —Trucks, 2129-2130, 347  
 —Trucks, 2131-2132, 347  
 —Trucks, 2133-2134, 347  
 —Trucks, 2135-2136, 347  
 —Trucks, 2137-2138, 347  
 —Trucks, 2139-2140, 347  
 —Trucks, 2141-2142, 347  
 —Trucks, 2143-2144, 347  
 —Trucks, 2145-2146, 347  
 —Trucks, 2147-2148, 347  
 —Trucks, 2149-2150, 347  
 —Trucks, 2151-2152, 347  
 —Trucks, 2153-2154, 347  
 —Trucks, 2155-2156, 347  
 —Trucks, 2157-2158, 347  
 —Trucks, 2159-2160, 347  
 —Trucks, 2161-2162, 347  
 —Trucks, 2163-2164, 347  
 —Trucks, 2165-2166, 347  
 —Trucks, 2167-2168, 347  
 —Trucks, 2169-2170, 347  
 —Trucks, 2171-2172, 347  
 —Trucks, 2173-2174, 347  
 —Trucks, 2175-2176, 347  
 —Trucks, 2177-2178, 347  
 —Trucks, 2179-2180, 347  
 —Trucks, 2181-2182, 347  
 —Trucks, 2183-2184, 347  
 —Trucks, 2185-2186, 347  
 —Trucks, 2187-2188, 347  
 —Trucks, 2189-2190, 347  
 —Trucks, 2191-2192, 347  
 —Trucks, 2193-2194, 347  
 —Trucks, 2195-2196, 347  
 —Trucks, 2197-2198, 347  
 —Trucks, 2199-2200, 347  
 —Trucks, 2201-2202, 347  
 —Trucks, 2203-2204, 347  
 —Trucks, 2205-2206, 347  
 —Trucks, 2207-2208, 347  
 —Trucks, 2209-2210, 347  
 —Trucks, 2211-2212, 347  
 —Trucks, 2213-2214, 347  
 —Trucks, 2215-2216, 347  
 —Trucks, 2217-2218, 347  
 —Trucks, 2219-2220, 347  
 —Trucks, 2221-2222, 347  
 —Trucks, 2223-2224, 347  
 —Trucks, 2225-2226, 347  
 —Trucks, 2227-2228, 347  
 —Trucks, 2229-2230, 347  
 —Trucks, 2231-2232, 347  
 —Trucks, 2233-2234, 347  
 —Trucks, 2235-2236, 347  
 —Trucks, 2237-2238, 347  
 —Trucks, 2239-2240, 347  
 —Trucks, 2241-2242, 347  
 —Trucks, 2243-2244, 347  
 —Trucks, 2245-2246, 347  
 —Trucks, 2247-2248, 347  
 —Trucks, 2249-2250, 347  
 —Trucks, 2251-2252, 347  
 —Trucks, 2253-2254, 347  
 —Trucks, 2255-2256, 347  
 —Trucks, 2257-2258, 347  
 —Trucks, 2259-2260, 347  
 —Trucks, 2261-2262, 347  
 —Trucks, 2263-2264, 347  
 —Trucks, 2265-2266, 347  
 —Trucks, 2267-2268, 347  
 —Trucks, 2269-2270, 347  
 —Trucks, 2271-2272, 347  
 —Trucks, 2273-2274, 347  
 —Trucks, 2275-2276, 347  
 —Trucks, 2277-2278, 347  
 —Trucks, 2279-2280, 347  
 —Trucks, 2281-2282, 347  
 —Trucks, 2283-2284, 347  
 —Trucks, 2285-2286, 34

## C

- Clarksville, O.:  
—Cambridge Transportation Co.  
Record cards, \*417  
Clayton, N. Y.:  
—Dailey's Bus Service:  
Bus with e-lestery roof, \*470  
Fare collection method, \*331  
Heavy duty plow, \*363  
Waiting room, \*418  
Cleveland, Ohio:  
—Cleveland-Akron Bus Co.:  
Operating rules, \*355  
—Cleveland-Youngstown Bus Co.:  
Fare collection system, \*117  
—Union Motor Stage Terminal:  
All bus routes invited, 354  
Arrangement and routes from, \*555  
—Wendler Tour of America Co.:  
Incorporates, 109  
Clutch (see Chassis)  
Colorado Motor Way (see Denver, Colo.)  
Colorado, State of:  
—Buses declared utilities:  
Highway on railroad bed, 425  
Safety measure, 161  
Columbia Stage Lines (see Portland, Ore.)  
Columbus, O.:  
—Zanesville & Dayton Transportation Co.:  
Incorporation, 156  
Combination of operators:  
—Advantages, Comments on, 240  
—Basis of National Auto Transit Co., \*5  
—Detroit association, 120  
—Success in Elizabeth, N. J., \*327  
—Watertown, N. Y., 252  
Community Traction Co. (see Toledo, O.)  
Competitive relations:  
—Buffalo, N. Y., 51, 401  
—Bus in traffic [Lane], \*289, [Emmons], 238  
—Co-ordinating aspects [Lee], 81  
—Co-ordination in California, [Pontius], 588  
—Coupon-bus plan blasted, 54  
—De Luxe service in Minnesota, 453  
—Illinois railway blames buses, 499  
—London bus companies, 365  
—Meeting unfair competition, 531  
—New Jersey tangle, 411, 475, 513; Comments on, 436, 533  
—Schenectady jitney situation, 305, 403, 452, 500, 551  
—Space required by vehicles, [Turner], 277, 322; [Ritchie], 352, 383; Comments on, 388  
—Trolley and bus for New York compared [Beeler], \*73  
—Trucks aid to railroads [Barnes], 146  
—Washington operators discuss, 400  
—Weehawken, N. J., ferry, 52  
Concourse Bus Co. (see New York City)  
Connecticut Motor Stage Ass'n.:  
—Annual meeting, 544, 590  
Connecticut Motor Transportation Co. (see New London, Conn.)  
Cox Transportation Co. (see Alliance, O.)

## D

- Dailey's Bus Service (see Clayton, N. Y.)  
Danbury Conn.:  
—Danbury & Bethel Street Ry.:  
Bus service and equipment, \*467  
Danielson, Conn.:  
—Interstate Bus Line:  
Service and equipment, \*571  
Davenport, Ia.:  
—Bus ordinance, 110  
—Tri-City Ry.:  
Bus plans, 453  
Dayton, Hamilton & Cincinnati Rapid Transit Co. (see Middletown, O.)  
Dayton, Ohio:  
—City designates routes, 599  
De Luxe Bus Line (see El Dorado, Kan.)  
De Luxe Line (see Minneapolis, Minn.)  
Denver, Colo.:  
—Colorado Motor Way:  
Operation [James], \*581  
—Denver-Steamboat Springs Line:  
Franchise granted, 54; Comments on, 34  
—Paradox Land & Transport Co.:  
Operation successful, \*332  
—Rocky Mountain Parks Transportation Co.:  
Advertising bus service, 26  
Detroit, Mich.:  
—Detroit Motorbus Co.:  
Annual report, 259, 550  
Extension of service, 154  
Prize crews rewarded, \*593  
—Ford workers traffic problem [Bibbins], \*561  
—National Auto Transit Co.:  
Methods and routes, \*5  
—Red Star Motor Drivers' Ass'n.:  
Plan and fees, 120  
—Wolverine Transit Co.:  
Methods and service, \*221  
Dubuque, Ia.:  
—Terminal provided by Chamber of Commerce, 302  
Duluth, Minn.:  
—White Bus Lines:  
Winter service, \*372  
Dunthorpe—Rivera Line (see Portland, Ore.)

## E

- Eastern Wisconsin Electric Co. (see Fond du Lac, Wis.)  
East Avenue Bus Line (see Rochester, N. Y.)  
East St. Louis, Ill.:  
—East St. Louis Ry.:  
Cross-town bus service, 105  
East York, Pa.:  
—East York Community Bus Line:  
Voluntary contributions for support, 545

- El Dorado, Kan.:  
—De Luxe Bus Line:  
Service of, 570  
Electrical equipment for buses:  
—Ignition:  
Magnet and generator combined, \*193  
Magnet with distributor, \*91  
Types on buses, 42, 94, 144, 196, 246, 306, 346, 442, 490, 540, 586  
—Lighting:  
Generator and Magnet combined, \*193  
Generator and switchbox, Remy, \*140  
Headlighting improvements [Falge and Brown], 349, \*493  
Planning and installation [Lee and Fessenden], \*273  
Spot light, Auto-Rechte, \*40  
Spot-light, with reflector, \*245  
Spot light in windshield, \*441  
—Motive power:  
Four motor trolley bus, \*290  
—Types on various buses, 196, 246, 296, 346, 394, 442, 490, 540, 586  
Electric storage battery buses:  
—Lansden type in Danbury, \*467  
Elizabeth, N. J.:  
—Elizabeth Avenue Bus Owners' Ass'n.:  
Traffic increased, \*327  
Elmira, N. Y.:  
—Elmira Watkins Line:  
Bus replaces railway, 501  
El Paso, Tex.:  
—El Paso and Los Angeles Stage Line Co.:  
Permit sought, 101  
Employees:  
—Bonus systems for safety and courtesy, 542  
—Co-operation sought in Chicago, 221  
—Driving strain problem [Gleason], \*341  
—Good drivers necessary, Comments on, 340  
—May party of Fifth Ave. Coach Co., 303  
—Recreation quarters in Chicago garage [Schwab], 507  
—Selection and training, \*421  
—Vacations and wage increases, 401  
—Vacation trip as reward, \*593  
—Watches important, 174  
Engine:  
—Clutch for Paris buses, \*142  
—Continental, Model 6-B, \*538  
—Details for bus service, 42, 94, 144, 196, 246, 296, 346, 394, 442, 490, 540, 586  
—Film of, 553  
—Filter for straining gasoline, \*143  
—Governor, K. P. Products Co., \*192  
—Governor, McCanna, 991  
—Governor, Throttle balance for, \*39  
—Hercules, Model O, \*293  
—High compression characteristics [Holloway, Huebner and Young], 148  
—High power for mountain districts, 583  
—Lycorning, Model C, \*342  
—Midwest, six cylinder, \*38  
—Piston light weight, \*441  
—Piston ring, two part, \*585  
—Radiator, cooling capacity [Lockwood], 149  
—Steam drive for bus, \*381  
—Tuning up valve, \*438  
—Waukesha four cylinder, \*143  
Engineer in public affairs [Gaetani], 98  
England (see Great Britain)  
Everett, Wash.:  
—Puget Sound International Railway & Power Co.:  
Bus operation success, \*459

## F

- Fare collection:  
—Closed system, \*117  
—Duplex system, \*326, \*331  
—Experience in Cincinnati, O., \*415  
—Light-weight box, Ohmer, \*141  
—Pay-enter-leave in New London, \*462  
—Ortonville (Minn.) Transportation Co., \*119  
—Problem to be studied, comments on, 138  
—Register for buses, \*244  
—Single punch required, \*575  
—Springfield fare box, 92  
—Stores sell tickets without commissions, \*115  
—Tickets for Kansas City Line, \*466  
—Weekly passes abused, 499  
—Workmen's tickets [Roller], \*1  
Fares:  
—Costs as basis, Comments on, 287  
—Florida, 70  
—Increase sought in Washington, D. C., 405; Denied, 454  
—InterState Bus Line, \*571  
—New Jersey question, Comments on, 437, 533  
—Rochester N. Y. (East Avenue Bus Co.), 115  
Fifth Avenue Coach Co. (see New York City)  
Financial:  
—Buses substituted for trolleys, 469  
—California buses, 55  
—Deferred payment on buses [McIntyre], 225; [Swan], 227; [Farmer], 250; [McIntyre], \*341  
—Depreciation charges, 405  
—Divisions of Chicago Motor Coach Co., 125  
—Motor bus credit corporation, 263  
—Participating stock issued, 259  
—Receiverships:  
Alliance Ohio, 159  
Dayton, Hamilton & Cincinnati Rapid Transit Co., 451  
—Responsibility of bus purchaser, [McIntyre], 225; [Swan], 227  
—Stock dividend, Comments on, 88  
—Stock sales to customers, \*323  
Fixtures (see Buses)  
Florida Motor Transportation Co. (see Miami Fla.)  
Florida State of:  
—Association (see Motor Truck Association of Florida)  
Routes and service in, \*65

- Fond du Lac, Wis.:  
—Eastern Wisconsin Electric Co.:  
Interurban bus service, 257  
France:  
—Paris:  
Bus service compared, \*23  
Clutch for buses, \*142  
Six-wheel bus details, \*220  
Franchises:  
—Purposes of [Blanchard], 202  
—Richmond, Va., terms, 53  
Freight and express:  
—Improves public relations, \*566  
—Profitable business for bus lines, Comments on, 487  
—Seats fold out of way, \*585  
Fresno, Cal.:  
—Valley Transit Co.:  
Oversize tires economical, 362  
Fuels and energy economy:  
—"Anti-knock" gasoline, 264  
—Discussed by S. A. E., 349  
—Future prices of [Lewis], 313  
—Gasoline, quality better, 578  
—Gasoline, Volume change with temperature, 575  
—Hints on reducing quantity, 285  
—New fuel announced, 171  
—Research on, 81  
—Steam driven bus economical, \*381  
—Trolley buses in Toronto [Forsyth], \*131  
—Trolley bus power, 416  
—Tulsa, Okla. [Hilburn], 200  
Fuel tank control, \*49

## G

- Garages (see also Repair shops):  
—Cleveland-Akron Bus Co., \*555  
—Concourse Bus Line, New York, \*461  
—Chicago, 200 buses, [Schwab], \*507  
—Efficient storage in [Reinhold], \*534  
—Equipment in Youngstown, O., 130  
—Fifty bus size, Providence, \*179  
—Plan of Kentucky Carriers, \*463  
Gasoline-electric buses:  
—Frost Smith double-deck, \*123  
Gasoline rail buses:  
—Nevada, California & Oregon R.R., \*565  
Georgia Motor Bus and Transportation Ass'n.:  
—Annual meeting, 102  
Germany:  
—Bus service compared, \*23  
Great Britain:  
—Birmingham:  
Double deck trolley buses, \*578  
—Bradford:  
Trolley bus costs, 598  
—Bus evolution, 63  
—Leyland single deck bus, \*426  
—London:  
Bus competition, 155, 355  
Bus service compared, \*23  
London General Omnibus Co.  
Activities of, 355  
Annual report, 453  
Development of buses [Shave], 399  
Low level bus developed, \*325  
Magnet testing, 417  
Traffic problem, 450; [Wooton], 522  
—London-Liverpool road proposed, Comments on, 533  
—News from, 51, 105, 155, 207, 256, 306, 355, 403, 450, 496, 547, 595  
—Trolley bus, front wheel drive, \*181  
Greely, Col.:  
—Bus competition, 155  
Groton & Stonington Traction Co. (see New London, Conn.)

## H

- Hagerstown, Md.:  
—Blue Ridge Transportation Co.:  
Co-operation with railway, 506  
Fare ticket and receipt, 575  
—Bus line transaction, 357  
Hamilton, O.:  
—Buckeye Transportation Co.:  
Stock issue desired, 56  
Hamilton, Ont., Can.:  
—United Lines, Ltd.:  
Harrisburg, Pa.:  
—Home-made oil filter, 512  
Headlights (see Electrical equipment for buses)  
Heaters (see Buses)  
Highland Park, Mich.:  
—Traffic study at Ford plant [Bibbins], \*561  
Highway Commission appointments, 262  
Highways:  
—Association (see American Association of State Highway Officials)  
—Bridge capacity, Comments on, 88  
—Colorado Midland roadbed to be used, 425  
—Common sense rules for, 426  
—Comparative tests of vehicles, \*9  
—Cost apportioned to benefit, Comments on, 532  
—Development proposals, 591  
—English-speaking road congress proposed, 552  
—Federal Aid System:  
Explanation, 351  
Federal regulation, 8, 132  
Road program, 185  
—International Road Association, 151  
—Lecture course on, 531  
—Maintenance help, Comments on, 241  
—Methods of state financing, 217  
—Motor road proposed in England, Comments on, 533  
—Motor transportation, International, 447  
—Requirements for construction, \*22  
—Requirements for safety, 47  
—Road Builders Ass'n. (see American Road Builders' Association)  
—Six-wheelers reduce stresses, \*529

Abbreviations: \*Illustrated, c Communications.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX



## Highways continued

- Soft roads overcome by belt •448
- State removal of snow Comments •48
- Street company of Yonkers Vol. 18
- Turner 377
- Transportation managed by railroad men
- (Reyes) 344
- Chicago North Shore & Milwaukee Ry.
- Maintenance by railway men (Corbitt)
- 445
- Feeder buses increased 108
- Hillside Bus Ass'n user West New York N. J.
- Holland Mich.
- Service Bus Line
- Winton rebuilt stage •264
- Houston Tex.
- Houston Galveston Trans. Co.
- Bathing beach service 447
- Hudson County Bus Owners Ass'n
- Activities 204

# I

## Illinois State of

- Railway strikes, abandonment due to buses 439
- Indiana Bus Owners' Ass'n
  - Activities 450
  - Organization 47
- Indianapolis, Ind.
  - Speed regulation for buses proposed 501
- Indiana State of
  - Bus service and regulation 481
  - Highways and buses 281
  - Legislation opposed 450
  - Taxes may increase rates 308
- Indiana Columbus & Eastern Traction Co. (see Springfield, Ohio)
- Inspection of buses
  - Accidents in Wichita, Kan. 473
  - California Transit Co. practice 167
  - Practice in mountains 315
- Insurance (see also Regulation)
  - Akron, O. requirements 57
  - Lowering rates, Comments on 287
  - Michigan interurbans plan 5
  - New York plans 330, 359
  - Ohio met. to form insurance company 301
  - Ohio Motor Mutual Insurance Co. 534
  - Ohio requirements 260
- International Ry. (see Buffalo, N. Y.)
- Inter State Bus Line (see Danielson, Conn.)
- Interurban Bus Ass'n (see Muskegon, Mich.)
- Iowa Motor Transportation Association,
  - Organization 152
- Iowa State of
  - Regulation advocated [Eby] 204
  - Unreasonable law over ruled 260

**J**

Jack uses Repair shops and equipment)

- Jacksonville, Fla.
- Municipal bus's considered, 157
- Jamestown, N. Y.
- Jamestown Street Ry.
  - Bus trial, 74
  - New bus line, 155
- Japan.
  - Bus service [Irvine], 147
- Jefferson Highway Transportation Co. (see Minneapolis—Minn.)
- Jersey City, N. J.
- South Hudson County Boulevard Bus Owners Ass'n
  - Fare controversy, 106, 154

## K

## Kansas City, Mo.

- Suburban Stage Lines Service and equipment • 465

**L**

Lake Shore Motor Bus Co (see Toronto C in 1)

- Lakes to the Gulf Highway Ass'n
- Others elected, 250
- Latham Motor Bus Lines (see Bradford, P4)
- Legal:
  - Competition and convenience, 358, Comments on, 338
  - Local consent retroactive, 211
  - Interstate bus lines not subject to double license fee, 455
  - Speeding defined, 310
  - Legislation pending, 211
- Linnston Transit Co. (see Portland Ore.)
- London (see Great Britain)
- Long Beach Cal.
  - Bus service improvements, 257
- Los Angeles Cal.
  - Applicants for Hollywood lines, 108
  - Buses recommended in report, 232
  - Bus system proposed, 104
  - Franchise sought by three interests, 153, 205
  - Los Angeles Motorbus Co.
    - Plans for service, 302, 353
    - Service started, 153
- Motor Transit Co.
  - Baggage checking, 574
  - Dual tires improve service, \*119
- Murietta Mineral Hot Springs Auto Stage Line
  - Routes questioned, 52
- Pacific Electric Land Co.
  - Additional feeders, 50
  - Service of, \*229
- Pacific Electric Railway
  - Bus design and construction, \*515
  - "Cloverleaf" signals used, \*582
- Pickwick Stages
  - Baggage checking, \*574
  - Control of Oregon Lines, 548
  - Oregon reynolds permits, 500

1 - 2 - 3 - 4 - 5

## M

$$M_{\text{eff}} = \frac{1}{2} \left( \frac{1}{M_1} + \frac{1}{M_2} \right)^{-1}$$

## N

Abbreviations • Illustrated • Glossary • Bibliography

READ THE INSTRUCTIONS AT THE BEGINNING OF THE ANSWER SHEET

National Automobile Chamber of Commerce:  
—New York meeting, 250  
—Track committee secretary, 544  
National Auto Transit Co. (see Detroit, Mich.)  
National Highway Traffic Assn.:  
—Annual meeting, \*208  
—Highway problems discussed, 47  
—California Association to help, 46  
National Motor Transport Assn.:  
—State organizations encouraged, 45  
Newark, N. J.:  
—Bus operations, Report on, 159  
—Bus service in railway strike, \*475  
—New Jersey Transportation Co.:  
—Bus service sought, 257  
—Public Service Ry.:  
—Decrease in riders, 513  
—Offers to purchase buses, 448; Comments on, 437  
—Public Service Transportation Co.:  
—Bus routes planned in Camden, 353  
Newburgh, N. Y.:  
—Hud-on Transit Corp.:  
—Bus extension planned, 106  
—Newburgh Public Service Corp.:  
—Buses better patronized, 469  
—Bus supplanting trolley, 60, \*103, 257  
—City service, Comments on, 533  
—Touring car buses outlawed, 211  
New Jersey, State of:  
—Bus service in railway strike, \*411, \*475;  
—Comments on, 436  
—Established lines favored, 54  
—Permits transferable, 57  
—Transportation problem, \*411, \*513; Comments on, 437, 533  
New Jersey Bus Transportation Assn.:  
—Annual meeting, 102  
New London, Conn.:  
—Connecticut Motor Transportation Co.:  
—Methods of, 503  
—Fare collection system, \*117  
—Groton & Stonington Traction Co.:  
—Buses and cars alternately, \*461  
New Orleans, La.:  
—Bus permit sought, 255  
New York City:  
—Bronx opposes trackless trolley, 303, 355  
—Bus controversy, 407, 452  
—Buses go to Albany to aid legislation, \*205, 289  
—Bus service compared with European cities, \*23  
—Concourse Bus Co.:  
—Bankruptcy, 549  
—Franchise granted, 259  
—Routes and maintenance methods, \*61  
—Service resumed, 304  
—Litigation, 156  
—Fifth Ave. Bus Securities Corp.:  
—Purchase offer accepted, 56  
—Fifth Avenue Coach Co.:  
—Conductors' badges effective, 22  
—Cross revenue, 406  
—Historical exhibit, \*401  
—Maintenance facilities, \*375  
—May party, 303  
—Savings fund, 285  
—Snow fighting methods, \*369; Comments on, 389  
—Vacations and wage increases, 401  
—Local consent required, 211  
—Municipal buses exempt from damage suits, 161  
—Nassau Bus Line:  
—Permit granted, 155  
—New York Transportation Co.:  
—Annual report, 357  
—Pelham Bay Parkway trackless trolley route enjoined, 303, 355  
—Safety measures, 543  
—Transportation systems proposed [Beeler], \*72  
New York, State of:  
—Association (see Auto Bus Association of New York State)  
—Funds for snow removal sought, 497  
—Home rule question, 205, 289  
—Priority rights ruled out, 57  
—Mutual insurance law, 359  
—Snow removal, \*363, 497  
Niagara Falls, N. Y.:  
—Buses advocated, 548  
Northern Ohio Traction & Light Co. (see Akron, O.)

## O

Oakland, Cal.:  
—California Transit Co.:  
—Maintenance of stages, \*167; Comments on, 191  
—Six wheel stage developed, \*265  
—City operates buses, 519  
Ohio Motor Bus Owners Assn.:  
—Annual meeting  
—Plans, 544  
—Proceedings, 590  
—Insurance plans, 301  
Ohio, State of:  
—Bus legislative plans, 102  
—Regulatory law, 260, 309, 406, 431, 455, 500, 551  
—Speeding defined, 310  
—Sunday school buses, 106  
—Transportation by buses, 357  
Omaha, Neb.:  
—Boulevard Transit Co.:  
—Service increased, 156  
Oregon Auto Stage Terminal Co. (see Portland, Ore.)  
Oregon, State of:  
—Association (see Automotive Carriers' Association of Oregon)  
—Bus mileage greater than railroads, 118  
—Routes and service, \*31  
Ortonville, Minn.:  
—Ortonville Transportation Co.:  
—Fare system, \*119

Ottawa, Can.:  
—Capital Bus Line:  
—Duplex ticket used, \*326  
Overhead contact system:  
—Toronto construction [Forsyth], \*131, 189

## P

Pacific Electric Land Co. (see Los Angeles, Cal.)  
Paradox Land & Transportation Co. (see Deaver, Col.)  
Pasadena, Cal.:  
—City bus system plan defeated, 54  
Paterson, N. J.:  
—Bus patronage in 1922, 158  
Paving:  
—Deflection tests at Pittsburgh, Cal., \*9  
—Tests of, \*4  
Pennsylvania Motor Bus Owners' Assn.:  
—Organization completed, 98  
Pennsylvania-Ohio Electric Co. (see Youngstown, O.)  
Pennsylvania R.R.:  
—Train service curtailed due to buses, 109  
Pennsylvania Rapid Transit Co. (see Philadelphia, Pa.)  
Pennsylvania, State of:  
—Call and demand rights, 260  
—"Common carrier" term questioned, 307  
—Peoples' Motor Bus Co. (see St. Louis, Mo.)  
Peuninsula Rapid Transit Co. (see San Francisco, Cal.)  
Petersburg, Va.:  
—Virginia Railway & Power Co.:  
—Trolley buses, \*379  
Philadelphia, Pa.:  
—Bus franchises sought, 53, 207  
—Philadelphia Rapid Transit Co.:  
—Bus franchise granted, 303  
—Bus plans, 402, 449, \*390  
—Bus service started, 495  
—Pennsylvania Rapid Transit Co.:  
—Trolley buses ordered, 331; Started, 546  
W. Va.)  
Phoenix, Ariz.:  
—Union Auto Transportation Co.:  
—Service and equipment, \*560  
Pickwick Stages (see Los Angeles, Cal.)  
Pocahontas Transportation Co. (see Welch, W. Va.)  
Port Arthur, Tex.:  
—Port Arthur & Port Neches Bus Line:  
—Buses for, \*8  
Port Jervis, N. Y.:  
—Port Jervis Traction Co.:  
—Bus franchise sought, 50  
Portland, Ore.:  
—Advertising stage travel, \*435; Comments on, 436  
—Columbia Stage Lines:  
—Depreciation charges, 405  
—Inquiry by commission, 259  
—Dunthorpe-Rivera Line:  
—Rebuilt Red bus, \*280  
—Lionton Transit Co.:  
—Annual report, 210  
—Oregon Auto Stage Terminal Co.:  
—Express business from, \*566  
—Financing and fees, 268  
—Loud speaker used, 574  
—Portland-Salem-Albany Stage Line:  
—Service of, \*33  
Pottstown, Pa.:  
—Banganan & Reynolds:  
—Methods used [Roller], \*1  
Providence, R. I.:  
—United Electric Rys.:  
—Bus operating data, 173  
—Bus permit granted, 154  
—Fifty bus garage, \*179  
—Jan. July report, 499  
Publicity:  
—Daily advertisement good, \*559  
—Methods of Wolverine Transit Co., \*223  
—Railroads co-operate, 26  
—Route signs important, Comments on, 486  
Public, Relations with:  
—Chicago Motor Coach Co., 221  
—Conductors' badges effective, 22  
—Courtesy developed, \*29  
—Express business aids, \*566  
—Historical exhibit in New York, \*407  
—Knowledge of connecting schedules, Comments on, 436  
—St. Louis service praised, 197  
—Service to patrons [Roller], \*1  
—Terminals an asset [Carnall], \*276; Comments on, 287  
Public Service Ry. (see Newark, N. J.)  
Puzet Sound International Railway & Power Co. (see Everett, Wash.)  
Purchases and stores:  
—Basis of purchases, Comments on, 35  
—Stockroom of California Transit Co., \*167

## R

Radiators (see Engine)  
Rahway, N. J.:  
—Bus line to parallel railway, 104  
Railways, Bus operation, 482; Comments on, 486  
Railways, compared with buses for New York City [Beeler], \*72  
Randolph, N. Y.:  
—Randolph-Jamestown Bus Co.:  
—Doughnut tires tried, 434  
Record forms:  
—Barometer of earnings [Swint], \*576  
—Cincinnati Motor Bus Co., 415  
—Cleveland Akron Bus Co., \*555  
—Daily and trouble reports, Youngstown, O., \*130  
—Defect and inspection, [Cordell], \*415

Record forms (continued):  
—Express business, \*566  
—Forms for, 30  
—Louisville, Ky., \*463  
—Minneapolis Line, \*84  
—Red Star Transportation Co., 417  
—Rochester, N. Y. (East Avenue Bus Co.), \*115  
—Shelling cards desirable, 331  
—Traffic, oil and gas, \*216  
—Washington Rapid Transit Co., \*183  
—Watertown Transportation Co., \*421  
—Wisconsin Motor Bus Lines, \*567  
—Yosemite Transportation System, \*318  
Red Ball Transportation Co. (see Mason City, Iowa)  
Red Bank, N. J.:  
—Boro Buses, Inc.:  
—Service increase, 54  
Red Star Motor Drivers' Ass'n. (see Detroit, Mich.)  
Regulation of buses:  
—Advantages [Blanchard], 202  
—Advocated for Iowa [Eby], 204  
—Cities adopt, 455  
—Colorado Commission decides, 57  
—"Common carrier" term questioned, 307  
—Convenience limitation, Comments on, 338  
—Davenport, Ia., 110  
—Elevating bus business, Comments on, 190  
—Federal-aid roads by federal government, 132  
—Fundamentals of [Blanchard], 47, 148  
—Florida, 65  
—History on railroads, 272  
—Indiana, 284  
—Interstate authority question, 161; 600  
—Legislation proposed, 161, 309  
—Michigan, 199, 551  
—Michigan Commission permits competitive lines, 501  
—Milwaukee, Wis., 406  
—Minnesota, 189  
—New York City, buses irresponsible, 161  
—Notes on, 110  
—Ohio, 260, 309, 406, 431  
—Omaha, Neb., 455  
—Oregon, 31  
—Permits transferable in New Jersey, 57  
—Priority not factor in New York, 57  
—Review of California decisions, 49  
—Size and speed limits in Quebec, 110  
—Taxi service disguise ended in California, 110  
—Tennessee, 234  
—Trend of [Kuykendall], 28, 86  
—Utah [Stoutnour], \*333  
—Washington law upheld, 211  
—West Virginia, 133  
Repair shops and equipment:  
—Brake relining machine, \*244  
—Chain hoist, Electrical, \*194  
—Commercial repairs also, \*215  
—Cylinder boring with honing tool, \*396  
—Grill and grinder, Portable, \*41  
—Electric hoist, \*295  
—Equipment for Concourse Bus Line, \*61  
—Facilities in Newark, N. J., and Milwaukee, Wis., \*472  
—Jack, Ball-bearing, \*195  
—Jack, Gear type, \*41  
—Jack, Heavy-duty, \*195  
—Jack, Heavy-duty dolly, \*342  
—Jack, with folding handle, \*194  
—Oil filtered through waste, 512  
—Oil reclaiming apparatus, \*243  
—Planing facilities, \*375  
—Practice of California Transit Co., \*167; Comments on, 191  
—Preparation for winter, Comments on, 533  
—Railway men on buses, [Cordell], \*444  
—Record cards shellacked, 331  
—Saw, Universal bench, \*390  
—Service to buses [Fielder], 252  
—Steel plate trolley, \*538  
—Washing set, Lavato, \*195  
—Weaver press for high-speed, \*41  
—Wheel pullers, Crane, \*192  
—Wheel puller for heavy duty, \*295  
—Yosemite Transportation System, \*315  
Reynolds Taxi Co. (see Clarksburg, W. Va.)  
Richmond, Va.:  
—Bus competition, 156  
—Richmond Rapid Transit Corp.:  
—Franchise granted, \*53  
—Weekly passes withdrawn, 499  
Ritter Motor Bus Co. (see Bloomington, Ill.)  
Road Service:  
—Emergency wagon used in New York, \*61  
—Troubles classified, \*315  
Rochester, N. Y.:  
—East Avenue Bus Line:  
—Bus service in storm, 107  
—Equipment, route and fare system, \*115  
—New York State Rys.:  
—Trolley buses planned, 332  
—Rochester Railways, Co-ordinated Bus Lines:  
—Buses ordered, 257  
—New line started, 401  
—Plans for service, 156  
—White Rapid Transit Co.:  
—Bus rebuilt, \*270  
Rocky Mountain Parks Transportation Co. (see Denver, Col.)  
Rockford, Ill.:  
—Rockford Traction Co.:  
—Bus route changes, 157  
—Roller bearings, Hoffmann, \*245

## S

St. Louis, Mo.:  
—Peoples Motor Bus Co.:  
—Permits sought, 551  
—Popularity of, 448  
—Service complimented, 497  
—Service started, 303  
—Traffic increasing, \*352  
—United Bus Transit Corp.:  
—Service plans, 50, 105, 255

Safety work:

- Always be careful. Comments on, 180
- Aunt J. Walker, \*342
- Bus systems, 342
- Bus operator—should aid, Comments on, 191
- Brake inspection, 185
- Crossing danger, 342, Comments on, 286, 48
- Crossing rules in Colorado, 161
- Fender bumper. Poking, \*396
- Four wheel brakes. Discussed by S. A. E., 348
- Comments on, 340
- Good drivers necessary. Comments on, 340
- National Highway Traffic Assn. discusses, \*378
- New York City, 343
- Rules in Camden, N. J., 151
- Saginaw, Mich.
- Bus plans, 102
- Franchise granted, 356
- Independent bus system voted against, 102
- Railway bus system defeated, 247
- Transportation proposals, 107, 157
- Sahsbury, Md.
- Shore Transit Co.
- Service started, 146
- San Diego, Cal.
- San Diego Electric Ry.
- Bus freedom increased, 108
- Buses to replace some rail lines, 304
- San Francisco, Cal.
- Municipal bus line, 108
- Peninsula Rapid Transit Co.
- Hydraulic brakes successful, \*367
- San Francisco Municipal Ry.
- Brake drums reinforced, 189
- San José, Cal.
- San Jose Stage Report, \*418
- Santa Monica, Cal.
- Bay Cities Transit Co.
- Franchise granted, 157, Referendum sought, 200
- Santa Rosa, Cal.
- Santa Rosa-Petaluma-Sausalito Auto Stage Co.
- Courtesy essential, \*29
- Service of, \*21
- Schedules and timetables
- Board for announcing, \*293
- Chicago Motor Coach Co., 125
- Connecting schedules should be known, Comments on, 136
- Descriptions included, 26
- Form of, Comments on, 532
- Inter State Line, \*571
- Modifying to agree with traffic in Chicago, 125
- New York Association plans, 589
- Pennsylvania Ohio Coach Lines, \*175
- Samples used in Reading, Pa. (Roller), \*1
- Skip tops used in Toronto, Ont., \*518
- Storm difficulties overcome, 103, 107
- Schenectady, N. Y.
- Bus controversy, 305, 403, 452, 500, 551
- Schuylkill Transportation Co. (see Mahoney City, Pa.)
- Seats (see Body)
- Seattle, Wash.
- Bus accident fatal to three, 105
- Service Bus Line (see Holland, Mich.)
- Shore Transit Co. (see Sahsbury, Md.)
- Snow removal
- Advance preparation, Comments on, 388
- Bradford, Pa., plowing, \*137
- Duties of state, Comments on, 487
- Fifth Ave. Coach Co., \*309, Comments on, 389
- Fighters (Desmond), 368
- Funds sought in Albany County, N. Y., 497
- Minnesota difficulties, \*372
- Passenger car plow, \*374
- Plows in New York State, \*363, Comments on, 389
- Plow rented, \*368
- Responsibility for, Comments on, 580
- Rotary snow broom. Fox, \*303
- Scraper snowplow, \*539
- State law sponsored by Association in New York, 544
- Society of Automotive Engineers
- Cleveland meeting on transportation, 237
- \*251
- Metropolitan section meeting, 248
- New York, January meeting, 80, 148
- New York, March meeting, 253
- Production discussed, 46
- Summer meeting
- Plans, 301
- Proceedings, 348, \*307; Comments on, 340
- Sonoma, Cal.
- Vallenti & Steurmer
- Cadillac chassis for stage, \*433
- South Hudson County Boulevard Bus Owners' Assn. (see Jersey City, N. J.)
- South New Berlin, N. Y.
- J. A. Wild & Son
- Rented plow, \*368
- Spain
- Cordeba uses Leyland buses, \*426
- Developments in bus service, 26
- Speedometer (see Body)
- Springfield, Mass.
- Independent operators opposed, 157
- Springfield Street Ry.
- Bus operation permitted, 104
- Bus service increase, 258
- Springfield, Ohio
- Indiana Columbus & Eastern Traction Co.
- Bus service started, 255
- Springs (see Chassis)
- Standardization
- Advantages [Clarkson], 218, Comments on, 240
- Battery dimensions, 252
- Educational work planned, 351
- Head and tail lights, S. A. E., 80
- Maintenance direction by [L. A. Schum], 248
- Standard parts advocated, 201
- Star Transportation Co. (see Mason City, Iowa)
- Statistics
- Analysis of possible bus operation, \*319
- Body design, \*15

5115

## U

## v

## W

## T

Abbreviations: \* Illustrated in Commutation  
E INSTRUCTIONS AT THE BEGINNING OF THE INDEX

## Wheels (continued):

- Six-wheeler construction and operation, \*529
- Small run type exhibited, 79
- Types used in buses, 42, 94, 144, 196, 246, 296, 346, 394, 442, 490, 540, 586

White Rapid Transit Co. (see Rochester, N. Y.)

## Wichita, Kan.:

- Bridgeport Bus Service:
  - Publicity, \*559
- Bus operation in flood, \*514
- Wichita-Valley Center Line:
  - Service increase, 306

Wild, J. A. & Son (see South New Berlin, N. Y.)

Wisconsin Motor Bus Lines (see Milwaukee, Wis.)

## Wisconsin, State of:

- Bus regulation law defeated, 359
- Wolverine Transit Co. (see Detroit, Mich.)
- Wonder Tour of America (see Cleveland, O.)
- Woodlawn Improvement Association & Transportation Co. (see Albany, N. Y.)

## Y

## York, Pa.:

- York Transit Co.:
  - Additional permit sought, 452

## Yosemite Valley:

- Yosemite Transportation System:
  - Service equipment maintenance, \*315

## Youngstown, Ohio:

- Pennsylvania-Ohio Electric Co.:
  - Bus service to Warren (Seely), 96
  - Service rendered, \*175
- Youngstown Municipal Ry.:
  - Bus operation, \*128
  - Service by buses increased, 207, 496
- Youngstown & Suburban Ry.:
  - Luxurious cars with individual chairs, \*319

## Z

Zanesville & Dayton Transportation Co. (see Columbus, O.)

## AUTHOR INDEX

## A

- Abbott, R. D.:
  - Dual vs. single pneumatic tires, 284

## B

- Barnes, Julius H.:
  - Transportation keyed to production, 146
- Beeler, John A.:
  - Trolleys favored for surface transport, \*72
- Berriman, A. E.:
  - Bus developments, 547
- Bersie, Hugh G.:
  - Taxicab body construction, 239
- Bibbins, J. Rowland:
  - Traffic at Ford factory, \*561
- Blanchard, Arthur H.:
  - Highway transport franchises, 47, 202
- Blum, A. C.:
  - Urban motor bus operation and cost, \*99
- Brown, W. C.:
  - Better headlamps and their adjustment (with R. N. Falge), \*493
  - Suggestions for better headlighting (with Falge), 349
- Bollum, H. L.:
  - Cause of bus growth, 251

## C

- Carmalt, L. J.:
  - Inter-city bus lines need local terminal stations, \*275
- Chase, Herbert:
  - Modern steering systems, 150
- Clarkson, C. F.:
  - The bus and standardization, 218
- Collins, J. F.:
  - Double-deck buses, 44
- Conlon, Leo F.:
  - Improved schedules greatly increase traffic in Elizabeth, \*327
- Cordell, Henry:
  - North Shore operation, \*444

## D

- Desmond, John:
  - The snow fighters, 368

## E

- Eby, C. W.:
  - Regulation of motor vehicles in Iowa, 204
- Emmons, C. D.:
  - Co-ordinating motor bus and electric railway, 228

## F

- Falge, R. N.:
  - Better headlamps and their adjustment (with W. C. Brown), \*493
  - Suggestions for better headlighting (with Brown), 349
- Farnor, Henry:
  - Financing sales on deferred payment plan, 250
- Fernandes, Guillermo:
  - Essential characteristics for a small bus, c311
- Fessenden, G. R.:
  - Electrical equipment for bus service (with T. L. Lee), \*273
- Fisher, R. E.:
  - Service problems, 252
- Forsyth, W.:
  - Trolley bus operation in Toronto, \*131
- Frankland, F.:
  - The ideal in bus design, c534

## G

- Gastani, Gelasio:
  - The engineer in public affairs, 98
- Gleason, A. L.:
  - A problem for solution, c344

## H

- Hale, J. C.:
  - Showing a car with low pressure air, \*307
- Harding, Warren G.:
  - Transport evolution, 352
- Hiburn, E.:
  - Motor bus experience in Tulsa, Ok., 200
- Hoxey, John C.:
  - Automobile commodities in 1923, 83
- Holloway, J. H.:
  - Engine behavior under high compression (with Hochotter and Young), 148
- Hochotter, H. A.:
  - Engine behavior under high compression (with Holloway and Young), 148

## I

- Irvine, W. L.:
  - Far East using bus service, 147

## J

- Jackson, Walter:
  - Individual and company applications of the motor bus, 121
- James, R. W.:
  - Good words from the mountains, c581

## K

- Kennedy, William P.:
  - Trolley buses and flexible vehicles for street railway service, 253
- Kuykendall, E. V.:
  - The trend of bus regulation, 28

## L

- Lane, F. Van Z.:
  - Co-ordinating bus and electric railway, c288
- La Schum, Edward:
  - Fundamentals of fleet operation, 248
- Lee, Elisha:
  - Motor transport and our railroads—a problem in co-ordination, 81
- Lee, T. L.:
  - Electrical equipment for bus service (with G. R. Fessenden), \*273
- Lewis, Warren K.:
  - Dollar gasoline chimera, \*313
- Lockwood, E. H.:
  - Cooling capacity of radiators, \*149

## M

- McIntyre, George:
  - Finance companies demand assurance of a good risk, 225
  - Financing bus sales on the deferred payment plan, c344
- Myers, Cornelius T.:
  - Progress in construction of motor-bus chassis, \*11

## P

- Parish, William F.:
  - Remedies for oil dilution, 359
- Pontius, D. W.:
  - Co-ordination of trolley and bus in California, 588

## Q

- Queency, J. A.:
  - The field of the trolley bus, 203

## R

- "Reader":
  - Determining bus operating cost and profits, c340
- Reeves, Alfred:
  - Does rubber endanger the rails? 527
- Reinhold, F. E.:
  - Improvement in garage storage, 534
- Ritchie, John A.:
  - Buses downtown in Chicago, 352
  - Place of the bus in city transportation, 383
- Roller, Bert G.:
  - Getting bus patronage in the smaller cities, \*1

## S

- Schwab, Martin C.:
  - How 200 buses are put under one roof, \*507
- Seely, Garrett T.:
  - The use of the interurban bus, 96
- Shave, G. J.:
  - Development of L. G. O. motor vehicles, 399
- Smith, Howard:
  - Development of transportation depends on tires, 444
- "Spectator":
  - Bright future for bus business in West Virginia, 434
- Stoutinour, Warren:
  - What motor bus regulation has accomplished in Utah, \*333
- Swan, Lawrence:
  - How buses can be bought on time, 227
- Swint, Roy H.:
  - Driver-to-other forms serve as barometer of bus line earnings, \*576
  - Systematic cost accounting will cut operating costs, c289

## T

- Taylor, E. P.:
  - Small city operation, c535
- Travis, W. E.:
  - Taxes and franchises, c35
- Thirlwall, J. C.:
  - Trolley bus made real progress in 1922, 7

## W

- Watson, E. E.:
  - Three years of bus operation, c139
- Wootton, Paul:
  - First-hand observations in London, 522

## Y

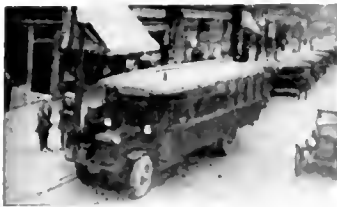
- Young, G. A.:
  - Engine behavior under high compression (with Holloway and Huebotter)

## PERSONAL INDEX

Bibbins, J. Rowland	163	McGreevy, N. H.	*456
Birmingham, J. A.	456	McKay, William J.	*261
Blair, Lewis H.	*312	Moreton, E. Foster	58
Blakely, Stephens L.	456	Moser, Herbert C.	163, 212
Brush, George S.	*552	Mullahey, Joseph W.	261
Bryant, E. L.	*163	Murphy, Grayson M. P.	58
Cameron, David	*360	Newton, M. H.	409
Colford, J. E.	*408	O'Brien, W. L.	*600
Dodd, James J.	112	Odell, Benjamin B.	*111
Davison, Bernard	591	Peartree, E. J., Jr.	502
Dummock, R. S.	*58	Pollock, Gilbert K.	213
Dukes, R. C.	505	Reese, William D.	361
England, Howard H.	164	Rhinock, Joseph L.	111
Flaherty, John N.	112	Sanborn, Ralph W.	*58
Fraser, Ivor	361	Schultz, Helen M.	*262
Geer, F. H.	*503	Seely, Garrett T.	*502
Hertz, John A.	*311	Siedeman, George L.	*504
Higgins, L. G.	600	Smith, C. Monroe	*59
Howell, F. D.	*59, *575	Snead, J. L. S.	58
Hull, E. V.	213	Spark, Ralph M.	213
Jacobs, Ralph L.	*108	Street, O. D.	*112
Kean, Vincent E.	*111, *312	Tomezack, Frank J.	*502
Kilken, William P.	*164	Thorn, Wray T.	112
Lee, Gordon	59, *552	Wales, Prince of	408
		Watson, Matthew	261
		Wootton, Edward	163, *360

Abbreviations: \*Illustrated Communications.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX



# BUS TRANSPORTATION



New York, January, 1923

## Getting Bus Patronage in the Smaller Cities

*By Bert G. Roller*

**Linking Up With Leading Department Stores at Each End of a Long-Distance Route Has Proved Profitable to Pennsylvania Line—How the Zone System and Cash Fare Receipts Work Out—Drivers Handled on a Common-Sense Basis**

**T**HE BUS LINE that accommodates—gives real service—and is always on the job, is the one that wins. So reason Bingaman & Reynolds, owners and operators of the Reading-Pottstown and Pottstown-Spring City bus lines, with headquarters at 119 Franklin Street, West Reading, Berks County, Pa. Hence, they are extremely careful to see that their vehicles are in good condition, which means good mechanics, as well as good buses; that the buses are kept on the road, which predicates good drivers; that there are reserve drivers constantly on hand in case of emergencies and that they are good "salesmen" and know their regular patrons by sight, boarding point and destination and, if possible to do so unobtrusively, by name.

Common sense, in fact, has guided all the doings of the partners since they started in business in July, 1921, with two buses running between Reading and Pottstown. For instance, they did not arbitrarily establish a bus stand, terminal or starting point and then try to induce customers to come there to board their buses. They scouted around until they found where the most people of bus riding tendencies in Reading and Pottstown came together most frequently in each of these centers of population and there they established their starting points. That was almost half the battle at the start, for customers were there, ready to ride and did not have to be sought out and importuned.

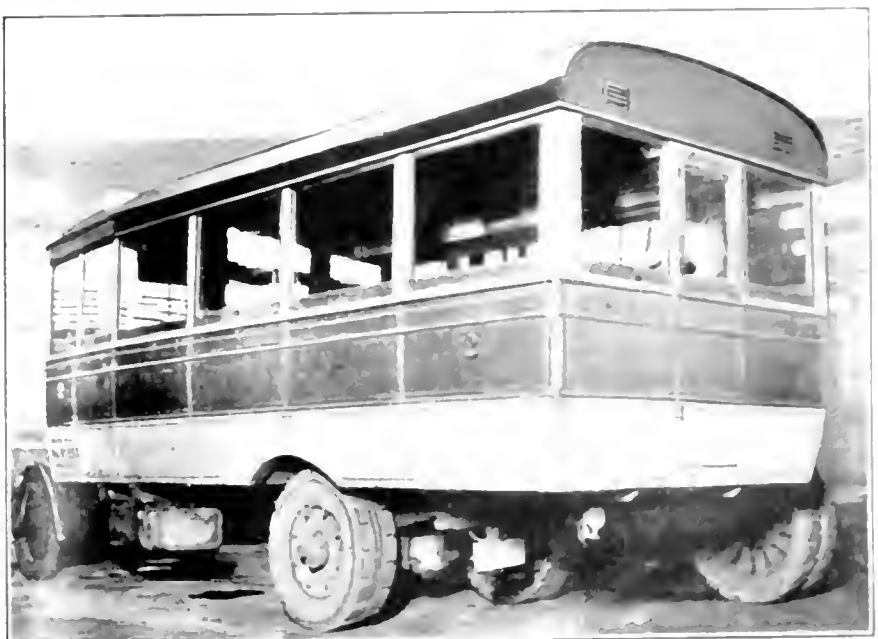
In Reading, this local point is in front of the large department store

of C. K. Whitner & Company, on Penn Street, near Fifth Street, the central ganglion of foot and vehicular traffic. In Pottstown, the "concourse" for bus riders is in front of the largest department store in that place, or Dives, Pomeroy & Stewart's. A master stroke of shrewdness on the part of the bus operators was shown in the arrangement they made with each of these department stores, whereby these establishments not only permit but invite and welcome the bus patrons to use their waiting rooms as a bus terminal, post placards printed at their own ex-

penditure, the entire works of the line and print and distribute the bus lines' schedule cards, shouldering the cost and using the reverse side of these cards for their own advertisements. This arrangement, of course, virtually establishes these particular bus lines as the recognized and quasi-official transportation agencies for these important stores into and out of which hundreds, if not thousands, of patrons pour daily.

Reading, in its "metropolitan" district, has a population of approximately 110,000 and, including the suburban area, has 125,000 inhabitants. It is a center where visitors from many other towns and cities come in large numbers daily. It is noticeable that the taxicabs "lay off" the department store field; that is, they do not encroach in an aggressive way, and the buses do not even resort to the artifice of having a stand "across the way" from the

*Type of bus, seating twenty-seven passengers, used by Bingaman & Reynolds.*



leading hotel, the Berkshire, or otherwise apparently seek to take in tow possible long-distance "fares" of the cab companies.

#### BUS FLEET OF FOUR UNITS

About all that the bus operators have to do is to obey the traffic regulations and adhere to the rulings of the State Public Service Commission, once they have received their certificate of public convenience. The city doesn't concern itself with the details of operation.

The present Bingham & Reynolds bus fleet consists of four units—three Sterlings, two of which seat comfortably twenty-seven passengers apiece and the third twenty-one passengers, and a Mack, seating twenty-five. Three of the buses are in constant use over the routes, while the

a 5-cent fare for each zone where a workman's fifty-trip ticket is purchased, and the ticket is sold to school children at the rate of 3½ cents per zone for fifty trips, or twenty-five round trips. Such tickets, ordered from the bus driver, are good until used, that is, until the last one of the numerals, from 1 to 50, bordering the card, which is pink, has been punched out, when it must be surrendered. The holder's name is written in on a dotted line, and on the face of the ticket is distinctly stated that it is not transferable. Each ticket bears a serial number. As the ticket is the same for workmen and school children, the company has a rubber stamp which it uses on the back, which reads: "Not Good on Saturdays, Sundays or holidays." The children's ticket has all these

tion in which the passenger is going. When the passenger gets his ticket, the driver punches the proper word, "Up," or "Down," and the zones through which he will pass to arrive at his destination, the customer paying the proper amount of fare for the number of zones to be passed through. When a passenger boards a bus at any point in one zone and rides into another zone, of course two zone fares will be collected.

The cash fare receipt ticket is so diminutive that the wonder is more passengers do not lose them; but the company asserts that very few do so. They have, for the most part, become accustomed to asking for and delivering up these receipts, and queries among both drivers and passengers tend to show that they do not consider it much bother, but rather in the light of a protection. The driver rings up the fare on the register, and tickets, register reading and cash must tally at the run's end.

According to the company, the arrangement of the workmen's and children's fifty-trip or twenty-five round-trip ticket operates to better advantage on the line than would a straight commutation ticket.

In all the buses, route cards or time-tables are placed where passengers may conveniently read them. Drivers are not permitted to start ahead of schedule time.

Between Reading and Pottstown seven round trips are made on week days. On Saturdays, Sundays and holidays an extra trip is made each way. On the Pottstown-Spring City line seven trips constitute the daily schedule, except on Sundays when the early morning trip is taken off.

It should be explained that Pottstown is in Montgomery County, Reading in Berks County, Spring City in Chester County and Royersford in Montgomery County. It is 18 miles from Reading to Pottstown on the bus route and about 10 miles from Pottstown to Spring City. It is necessary to cross a bridge over the Schuylkill River to get to Royersford from Spring City, and the bus starts from Royersford, not Spring City, as will be noticed in the time-table, in coming into Pottstown.

Buses not working on routes—usually there is not more than one in reserve—are, as already mentioned, open to chartering. They may take parties on sightseeing tours, which is not infrequently the case in summer; or they may haul crowds to picnics, baseball games, lodge meet-



*In the garage terminal at West Reading at the end of the run*

fourth, when not on a route, is open to chartering.

There are two buses, at least, always on the Reading-Pottstown route, which is traversed in an hour and five minutes under ordinary traffic conditions; and one bus, ordinarily, on the Pottstown-Spring City run, which usually takes but forty-five minutes. Three of the buses are equipped with Sewell wheels and the fourth has pneumatic tires. The bus interiors are heated through the exhaust of the engines, and a battery controls the lighting system direct. There are four dome lights in each body.

#### FARE SEVEN CENTS PER ZONE

The buses are run on the "pay-enter" plan, through a zone system. The regular cash fare is 7 cents per zone on the Reading-Pottstown line; but on the Pottstown-Spring City line, however, there is, in addition,

conditions, while the word "Saturday" is crossed out on the workmen's ticket.

Where no trip ticket is bought and the customer pays a cash fare, the driver hands him a "cash fare receipt," in the form of a yellow ticket, 2 in. long by 1 in. wide, which the passenger retains until he is leaving the bus, when he returns it to the driver. The ticket has a line reading: "Always Insist on a Receipt." Holding such a receipt not only protects the customer, but also aids the driver, especially where there is a crowd boarding the vehicle, enabling him to keep a check on the number of fares paid. On the reverse of this tiny ticket are listed the seven zones on the trip, with the word "Up" at the head of the column, and "Down," at the bottom, to indicate the direc-

ings, or the like. A bus on a trip like this may not run many miles in a day, but on tourist trips, specially chartered, the company has sent a bus out on a three-day journey. Usually not more than 100 miles is made in a day by a chartered bus for any occasion. Runs, however, have frequently been made as far as Pittsburgh.

Charges for chartering a bus are not by the head, as is the case with some companies, but at the rate of \$1 a mile. While care is exercised not to overload a bus for such expeditions, not infrequently campstools are placed in the aisle when the destination is the same for the

one. A "silk special" for the benefit of the Reading hosiery mills is maintained between New York and Reading, by way of Allentown.

The garage at West Reading is equipped with plenty of the lightest kinds of tools and work benches for making adjustments and minor repairs on the vehicles, and a service car also is kept here, ready to start at a moment's notice for any point on the routes in case of an accident.

#### Operator's trip report

The driver turns in one of these reports at the end of the end of his trip. It contains fare receipts, tickets, ticket sales, total for the day, and cash must be paid. The cash fare receipts are "Up" or "Down" tickets, and the driver, for the number of "Up" tickets, passed through by the passengers. If the number of "Up" tickets is not the same as the number of "Down" tickets, the driver usually remembers to turn in the "Down" tickets also.

The company has six drivers—one for each bus and two in reserve for shifts—whom it employs on a straight wage basis, allowing a small bonus, however, in the case of extra trips and special charter runs, provided that the business warrants it. The men are handled on a common-sense plan, in which there is neither paternalism nor far-fetched attempts to conciliate. They are not "bawled out" on every provocation, nor are they coddled. They are handled strictly on the basis of what they are paid, and those with certain specified duties to perform on scheduled time. The fares are so quartered that, at the end of the day's runs,

Various expenses, with their balance sheet, are worked out, and

**Pottstown-Spring City Bus Line**  
TIME TABLE  
Effective October 1, 1922

**WEEKDAYS**  
Lv. Royersford—6:00, 7:45 A. M., 1:00, 2:30, 7:00, 9:15 P. M.  
Lv. Pottstown—7:00, 10:30 A. M., 2:30, 4:15, 8:00, 10:00 P. M.

**SATURDAYS AND HOLIDAYS**  
Lv. Royersford—6:00, 7:45 A. M., 1:00, 2:30, 7:00, 9:00 P. M.  
Lv. Pottstown—7:00, 10:30 A. M., 10:00 P. M.

**SUNDAYS**  
Lv. Royersford—4:30, 11:00 A. M., 2:00, 9:30 P. M.  
Lv. Pottstown—9:40, 12:00 A. M., 3:10, 10:30 P. M.

**Tariffs for each zone**  
School Children—50¢ Trip Tickets  
Zone, good only on School Days. E. Order from Driver  
Zone Limits—First, Kentworth Second, Miller's Corner, Third, Park Office, Fourth, Front of State Institution, Royersford.  
When passengers get on at any point in one zone and ride into another zone two zone fares collected.  
Time required to make trip, 45 minutes.  
Time required to make trip may be longer.  
Time is heavy time required may be longer.  
Tariff rates on file in Company's Office.  
Tariff rates on file in Company's Office.  
PLEASE HAVE EXACT FARE READY  
BINGAMAN & REYNOLD  
owners and Op  
119 Franklin St., West Ro  
[over]

Pottstown-Spring City bus line time-table. On the back is printed the advertisement of a business concern whose store the buses pass.

entire party chartering the vehicle.

The company owns its commodious brick garage in West Reading, which is also the headquarters for a motor express business conducted by the concern. Here is the permanent home of at least two buses; another is kept in a garage at Royersford and another in a public garage at Pottstown. The activities of the company's motor express business undoubtedly help to draw customers for the bus lines, and vice versa, each one being a good advertisement for the other. The motor express runs between Reading and Philadelphia and Reading and New York City, between which points there is much traffic, especially in textile

**Bingaman & Reynolds Bus Lines**  
**50 TRIPS**  
GOOD IN EITHER DIRECTION BETWEEN  
and  
Issued to  
Not valid unless received by W. A. Yoder  
BINGAMAN & REYNOLDS  
No. 42 43 44 45 46 47 48 49 50

**BINGAMAN & REYNOLD'S BUS LINE**  
OPERATOR'S TRIP REPORT

From To  
Bus No. Date

REGISTER READINGS ZONES			TRIP TIME	
Zones	Tickets	Register	Finish	Start
7				Start
6				Top
5				
4				
3				
2				
1				
Total				
Pkg				
Chg				
Ticket				
Sales				
Total				
Operator				

**UP**  
• 1st Zone  
• 2nd Zone  
• 3rd Zone  
• 4th Zone  
• 5th Zone  
• 6th Zone  
• 7th Zone  
**DOWN**

#### Operator's trip report form and cash fare receipt

The driver turns in one of these reports at the end of the end of his trip. It contains fare receipts, tickets, ticket sales, total for the day, and cash must be paid. The cash fare receipts are "Up" or "Down" tickets, and the driver, for the number of "Up" tickets, passed through by the passengers. If the number of "Up" tickets is not the same as the number of "Down" tickets, the driver usually remembers to turn in the "Down" tickets also.

**READING-POTTSTOWN BUS LINE**  
TIME TABLE  
Effective October 1, 1922

**WEEKDAYS**  
Lv. Reading—6:00, 7:45 A. M., 1:00, 2:30, 7:00, 9:15 P. M.  
Lv. Pottstown—7:00, 10:30 A. M., 2:30, 4:15, 8:00, 10:00 P. M.

**SATURDAYS AND HOLIDAYS**  
Lv. Reading—6:00, 7:45 A. M., 1:00, 2:30, 7:00, 9:00 P. M.  
Lv. Pottstown—7:00, 10:30 A. M., 10:00 P. M.

**SUNDAYS**  
Lv. Reading—4:30, 11:00 A. M., 2:00, 9:30 P. M.  
Lv. Pottstown—9:40, 12:00 A. M., 3:10, 10:30 P. M.

**Tariffs for each zone**  
School Children—50¢ Trip Tickets  
Zone, good only on School Days. E. Order from Driver  
Zone Limits—First, Kentworth Second, Miller's Corner, Third, Park Office, Fourth, Front of State Institution, Royersford.  
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Time required to make trip may be longer.  
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Tariff rates on file in Company's Office.  
PLEASE HAVE EXACT FARE READY  
BINGAMAN & REYNOLD  
owners and Op  
119 Franklin St., West Ro  
[over]

Reading-Pottstown bus line time-table. The reverse side of this also carries the advertisement of a local merchant.

the company decided in favor of Sewell wheels for all but one bus. Two expert mechanics are on hand to look after the needs of the buses.

The company has six drivers—one for each bus and two in reserve for shifts—whom it employs on a straight wage basis, allowing a small bonus, however, in the case of extra trips and special charter runs, provided that the business warrants it.

The men are handled on a common-sense plan, in which there is neither paternalism nor far-fetched attempts to conciliate. They are not "bawled out" on every provocation, nor are they coddled. They are handled strictly on the basis of what they are paid, and those with certain specified duties to perform on scheduled time. The fares are so quartered that, at the end of the day's runs,



they go to a garage in the driver's home town, which arrangement is obviously the most economical one possible. The early-shift driver is ready early in the morning to take up his work.

In summer the company generally puts on two extra men, because of the more frequent opportunity for chartered trips over a long distance, which otherwise would disturb the shifts and make them too long.

In summer each man on regular duty has four trips each way, or eight trips in his day's work. The trips are so divided that the Pottstown driver and the Reading driver, for instance, are at home at the end of their day's run.

The company prides itself on having only courteous and thoughtful as well as expert and careful drivers. They are trained to be on the alert for possible passengers and even blow their horn, or whistle if a "regular" patron is a trifle tardy when they are arriving at the point at which they are accustomed to pick him up at a certain time. The bus riders greatly appreciate thoughtfulness of this kind, which is no small factor in building up good will for the company and the bus business in general, if only because it is diametrically opposed to the usual street railway methods. Hence, the bus drivers actually get and weld business to the company.

Each driver is supplied with daily "Operator's Trip Reports," a white form, 3½ in. x 5½ in., a slip being used for each trip. This form contains spaces for entries to be filled out as follows:

Point of starting to point of destination; number of bus and date; trip time, whether morning or after-

noon, including designation of trip; time of starting and time of finishing; register readings and tickets punched by zones, with total for each; number of packages carried to accommodate passengers; number of tickets sold, and totals; and calculations and remarks. Each driver

makes a neat bundle of his cash fare receipt tickets at the end of his run, and the ticket sales total, register reading total and money taken in must check up with them. The operator signs his name at the bottom of the bus form before turning it in at the office at the end of his run.

## Traffic Tests Begin at Arlington

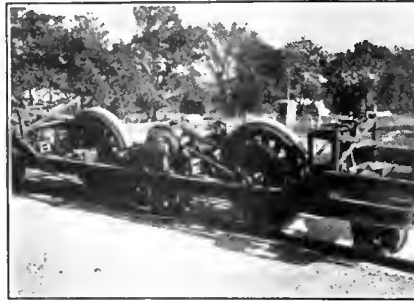
TRAFFIC has been started on the circular track of the Bureau of Public Roads of the United States Department of Agriculture, at the Arlington Experiment Station, in the experiment to determine the cause of waving in bituminous sur-

in the surface, both in the upper and lower portions.

At present traffic is being confined to a path 2½ ft. wider than the distance between the outside edges of tires in order to obtain an accelerated test. This will also leave a space on the track for investigation under summer temperatures.

The wear test on the circular track consisting of sixty-one sections of concrete and located at the outside edge of the bituminous track has also been commenced. In this test concrete made of many different materials and mixes is being subjected to a traffic of two solid rubber-tired wheels loaded with 600 lb. per inch of width of tire (about that of a 5-ton truck) and traveling at 20 m.p.h. This device is guided by wheels traveling on rails; it is electrically driven, the power being transmitted to one of the wheels used to represent the traffic which will make this wheel act as the drive wheel of a truck.

On both the bituminous and the concrete wear test, traffic will run continually during working hours, but from the nature of the tests thousands of trips and a considerable period of time will be necessary before much data are secured.



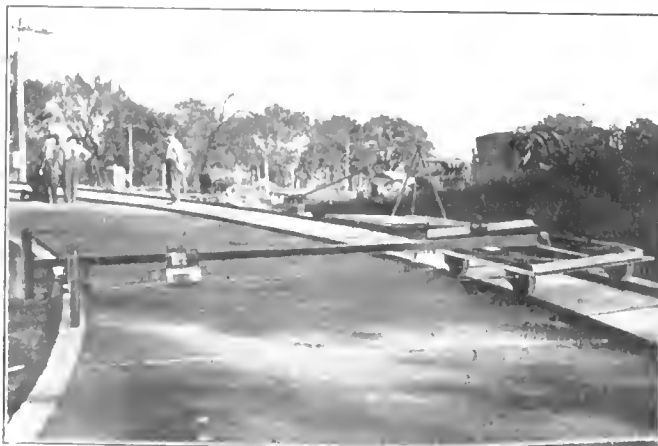
*Electrically driven device used in concrete wear test.*

faces. The track is composed of twenty-seven sections of asphaltic concrete of different mixtures.

Before starting the traffic, profile measurements of the surface were taken at frequent intervals with the autographic profile device especially devised for the purpose. These will be repeated from time to time as the tests progress, in order to determine the rate of formation of inequalities in the surface.

It is also planned to study the flow of the bituminous concrete under traffic. This will be done by noting the movement of brass plugs placed

*Apparatus used to make initial record of irregularities of the surface.*



*Circular track for bituminous-surface tests. Track for concrete shown at outside.*





## Michigan Corporation Builds Business for Individual Owners of Touring Cars

**O**PERATING out of Detroit, Mich., to Lansing, Jackson, Toledo and other points is a system of touring cars that furnishes a striking example of the possibility of selling transportation by the organization of owners of individual vehicles.

The National Transit Company, Inc., which has its main waiting room at 212 Bagley Avenue, Detroit, is responsible for this development. It started in 1922, when several Michiganites conceived the idea of uniting the "hiring car" owners, who had been operating independently. The purpose was to furnish regular schedule service to the cities and towns in southern and central Michigan. It is proposed to expand operations into other sections as fast as organization and waiting room facilities can be built up to the standard required.

The plan which has been worked out is original in many respects. All vehicles are owned and maintained by their drivers. The National Transit Company, while it helps the drivers to secure better prices on supplies, is mainly an agency for the sale of transportation.

The most important provision of the contract the company has with each owner-driver is regarding revenue. The income from passengers is divided so that 80 per cent goes to the owner, and the remaining 20 per cent to the company. In return for its 20 per cent the National Transit Company sells the service and provides passengers. This is done through terminals and waiting rooms in the various cities where there are agents, and in other cities by arrangements with porters at the principal hotels.

The company has general supervision over the operation of the cars, makes the schedules, determines the rates of fare to be charged, sells tickets at its waiting rooms, and makes a daily settlement with each driver for his share of the business.

The owner-driver must report thirty minutes before his scheduled leaving time, and must maintain his

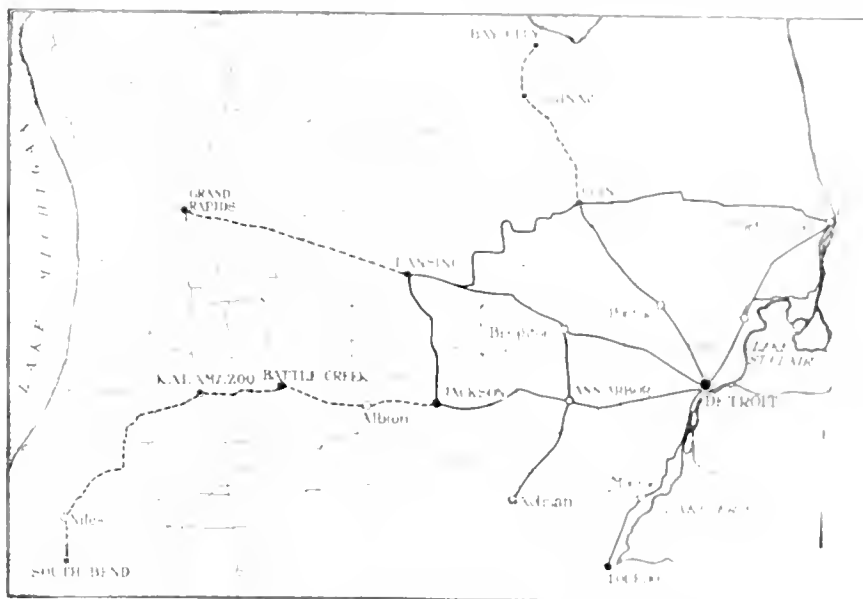
### The Corporation Handles Sale of Transportation and Supervises Operation Over Regular Routes Under Fixed Schedules—Pick-Up Service Is Maintained in Principal Cities

car in first-class operating condition. Not only the running gear but the general appearance on the outside and the interior must be kept up.

The owner-driver is required to

have a valid Michigan license, a car for hire, and pay \$16 a month for Michigan state tax, \$10 a month for seven per cent license tax. Then the driver must have a four's license, from the state, costing \$2.50 a year.

Another advantage that the company has is in the purchase of supplies. The company maintains a stock of oil, with whose agent it has a contract, and with whose agent it has a contract, and can be purchased at wholesale prices. Special orders are placed by the company on specified dealers, and through these the owners get a 40 per cent discount on tires, gas, etc.



*Routes covered by Michigan system of touring cars operated on scheduled service*

bond his car both for personal liability and for damage to property through collision. The liability insurance is in the amount of \$2,500 for accident to any one person or \$10,000 for injuries in any one accident. Property damage to the amount of \$1,000 is carried. This costs the drivers about \$180 a year, which is paid monthly in advance. Most of the policies, it is said, are written by the Central Mutual Insurance Company of Detroit.

The expenses of all vehicle taxes and licenses are likewise borne by

at 2 cents a gallon off the curb price, and accessories at from 30 to 40 per cent of list price.

When the service was started in April, 1922, seven routes were operated, these covering about 464 miles of highway and requiring 125 cars for the daily schedules. Later on, twenty-five more vehicles were added for the 60-mile route to Toledo. The latest route, to Ann Arbor, Mich., branches off the Detroit-Jackson route at Ann Arbor. As shown on the accompanying map, most of the routes radiate from Detroit.

<b>N<sup>o</sup> 7600</b>	<b>N<sup>o</sup> 7600</b> <b>JUN 21 1922</b>	<b>The National Auto Transit Co.</b> Main Office and Terminal 212 Bagley Ave., Detroit, Mich. THIS TICKET IS GOOD FOR ONE FARE
	From ..... To .....	Amt. ....
	From ..... to .....	Driver's No. .... Name .....
	Sold by .....	Checked .....

Form of ticket used in waiting rooms. Size 2½ x 5½ in., bound in books with perforation at edge

although Lansing-Jackson and Flint-Port Huron do not touch Detroit at all. The accompanying table indicates that 186 cars are now being operated over 668 miles of route.

The plans for extension contemplate scheduled operations from Detroit all the way to Chicago. The map shows only lines contemplated as direct extensions of existing routes; on the north through Flint to Saginaw and Bay City, on the west beyond Lansing to Grand Rapids, and on the southwest through Jackson, Kalamazoo, to South Bend, Ind.

On all the routes now in operation there is competition, and as a result of its experience the company is in favor of a restricted franchise so that only sufficient service will be provided for the traffic offered. In addition to the free-lance operator, running touring cars on a for-hire basis, steam railroads and electric interurbans provide service over most of the routes.

The waiting rooms which provide terminal facilities at Detroit and at Flint, Jackson, Toledo, Lansing and Port Huron of course draw business. Whenever possible the agents there sell tickets, of the form shown, to

passengers before they board the cars. There are two reasons for this: First, it lessens the chance of dishonesty on the part of the driver by decreasing the amount of money handled; second, passengers who re-



Card handed out by driver, and said to be best traffic builder.

serve places and buy tickets in advance for particular trips are not likely to change their minds and travel by other routes.

Newspaper advertisements are carried in local papers. Printed time-tables are distributed at points where people congregate, especially in the hotels throughout the territories served. The best business getter, it is said, is the small card illustrated here, which the drivers issue to each passenger. This in-

forms the passenger of the existence of the National Transit Company, of the fact that he is traveling in one of its vehicles, and also makes him acquainted, so to speak, with the driver of the vehicle. This means of advertising, it is believed, has done more than any one thing to build up the business.

#### UNIFORM BASIS OF FARES

All fares are figured on a charge of 3.25 cents a mile, with a minimum of 25 cents. Round-trip tickets at a reduced rate are not sold except between Detroit and Lansing, and Flint and Long Lake. On these two routes it is thought necessary to promote the return traffic. On the first, people are likely to come back by other means of transportation, while on the second many travelers return in privately-owned passenger cars that may be making the trip, with the resulting loss to the Transit Company.

The cars take in from \$130 to \$150 for a week of seven days, and as they cover about 125 miles daily, the income is around 16 cents per mile. On the 20 per cent basis the company gets 3 cents per mile for its labor. The operating expense for gasoline, oil and tires is only 3.5 cents a mile, thus leaving 10 cents to the driver for profit, after meeting other charges.

The traffic during the summer months was about 100 passengers a day from each of the six waiting rooms. With an average fare of \$2.25, this gives a daily revenue of \$1,350, which is equivalent to about \$500,000 annual revenue. For the whole year it is estimated the revenue will amount to \$750,000, this including the income from the sale of confectionery, papers and cigars, at the waiting rooms.

In all the operations so far standard seven-passenger touring cars of the better class have been used. These include Cadillacs, Packards, Marmons, Studebakers, and others, and appear to be the best form of vehicle to start the service. It frequently has happened that not only two but three or four cars have been sent out, when only one had been scheduled. As this traffic becomes permanent, it is planned to put on enclosed buses to take care of it.

The officers of the National Transit Company, Inc., are C. S. Stiles, president; B. C. Elliott, vice-president; M. C. Dopp, secretary, and O. E. Watkins, treasurer and dispatcher.

Route Statistics for National Transit Company, Inc.

	Number of Vehicles	Headway, Hours	Normal Outside Time		One-Way Distance, Miles	Running Time, Hr. Min.	One-Way Fare
			A. M.	P. M.			
Detroit to							
Adrian	10	2	7 00	6 00	62	2 30	\$2.00
Ann Arbor	18	1	7 30	9 30	40	1 30	1.00
Flint	35	1	6 00	8 00	60	2 30	2.00
Jackson	18	2	6 30	6 30	72	3 15	2.65
Lansing	30	1	7 00	9 00	85	3 20	(a) 3.00
Port Huron	18	2	8 00	6 00	60	2 30	2.00
Toledo	25	2	7 00	11 30	61	2 30	2.00
Ann Arbor to							
Brighton	3	2	8 00	6 00	36	1 20	1.00
Flint to							
Lansing	8	2	8 00	6 00	68	2 30	2.25
Long Lake	5	2	12 00	10 00	13	0 35	(b) 0.65
Port Huron	8	2	8 00	6 00	71	2 50	2.50
Lansing to							
Jackson	8	2	8 00	6 00	40	1 15	1.00

(a) Round trip fare \$5.50. (b) Round trip fare \$1

# Trolley Bus Made Real Progress in 1922

By J. C. Thirlwall

Railway Engineering Department, General Electric Company, Schenectady, N. Y.

**The Author Shows That, While the Aggregate Number of Buses Actually Put Into Commission Last Year Was Small, There Were Evidences of Widespread Interest in This Vehicle**

TO THOSE of us who believe that the trolley bus offers a distinct improvement in trackless transportation, the past year has given both hope and disappointment. Several installations were made and satisfactory results are reported from each, but the number was smaller than was anticipated and the total of buses yet in service is not impressive. There is good reason to believe, however, that 1923 will see a material increase in the use of this electrically driven vehicle. At the present time there are in service in this country and in Canada thirty-six trolley buses, operating on about 30 miles of route.

## NEW YORK INSTALLATION LEADS

The largest installation is that made by the city of New York on Staten Island, with 15.5 miles of route and fifteen buses. Seven of these buses, on 6 route-miles, have been in service since October, 1921; the other eight went into commission a year later, on a new 9.5-mile route. Construction is well under way on a third route at City Island, and seven buses will shortly be placed in service there.

The buses now in operation seat thirty passengers and weigh about 12,000 lb. They are driven by two 25-hp. railway motors and have a K-63 controller. Current is brought to the controller through a foot-operated line breaker, so that the operator can instantly shut off power by releasing the foot switch. The line breaker is also interlocked with the emergency brake so that if the latter is applied the breaker opens and power is cut off from the motor circuit. The use of the hand control for speed changes has proved simpler and easier to handle than the gear shift used on gas buses and has been entirely satisfactory to the operators. A single-pole collector of the slider type has been adopted, and the overhead on all three routes was designed for this type of collector.

All three routes serve as extensions and feeders to existing rail lines. The territory served was for the most part open country, through which it would have been difficult to justify the cost of laying rails, but the regular, fast service given by the trolley buses has proved so dependable and satisfactory that a great influx of population has occurred and houses are being built adjacent to the lines at a really amazing rate. The result has been that riding has steadily increased, and the buses, which are about the largest single-deck cars used anywhere, are kept fairly full on fifteen-minute headways, and are showing earnings of more than 20 cents per mile on a 5-cent fare.

Seven of the buses have been in service for about fifteen months. At the end of the first year's operation, which included experience through several severe snow and sleet storms, and operation for several months on a road that was torn up for repaving, the Commissioner of Plant and Structures, Grover A. Whalen, publicly stated that the trolley buses were operating for less than 19 cents per mile as compared with a cost of nearly 28 cents for gas buses running under the supervision of his department. The latter are considerably smaller and lighter, on an average, than the trolley buses. His own records indicated a lower operating cost for the trolley buses than the safety cars on the Staten Island rail lines, also operated by the city. He concluded by saying: "I feel I am warranted, therefore, in asserting that the Department of Plant and Structures has developed in the trackless trolley system a means of passenger transportation more economical than any yet conceived."

That Mr. Whalen and the city engineers are satisfied as to the superiority of the trolley bus over the self-propelled type is evidenced by their request for an appropriation to add about one hundred more miles

of track. The city is spending about one-half million dollars. It is expected that the project will be carried out during 1923.

## CHICAGO LEADS SECOND Trolley Bus

Early in 1922 Chicago installed two trolley buses on a 1.5-mile route, which was a part of the city's existing trolley system. The trolley bus is a single-deck car, 25 ft. long, 7 ft. 6 in. wide, and has a 25-hp. motor. That is, the trolley bus is a single-deck car, 25 ft. long, 7 ft. 6 in. wide, and has a 25-hp. motor. The collector is of the slider type and standard overhead trolley system is used for power transmission.

For motive power, a gas engine is used, and it is reported that the operating cost is very satisfactory.

In May, 1922, Washington installed the example of how a city can get and put into service a trolley bus of similar design. It consists of three routes aggregating about 5 miles in length. As the routes are feeder to the existing trolley system, they are operated in conjunction with the regular trolley lines. The report that the city has installed regular service to replace the few dead-end streetcar lines is incorrect, and state that the form of transportation is well adapted for the existing sections where the track is normal in height.

## BALTIMORE EXTENDING RANGE OF Trolley Buses

A route at 6 miles in length of the Baltimore system had been served by gas buses for many years. On Nov. 1, 1922, at the request of city officials who desired the guarantee of permanent operation, the city ordered the purchase of three trolley buses, which will be in service.

These buses operate on a 1.5-mile route at 14 ft. 6 in. to 15 ft. 6 in. apart, a little less than 1 mile apart. These buses have a somewhat larger seating capacity than those used in New York and Canada, carrying two passengers. They carry two 25-hp. motors with a separate foot-operated control. Two trolley poles with swivel-mounted wheels are used, and standard overhead trolley con-

struction. The normal power consumption is approximately 1 kw.-hr. per bus-mile, and the maximum, with heaters and lights on, about 1.5 kw.-hr. The receipts on this line are reported to have materially increased since the trolley buses went into service.

#### SMALLER INSTALLATIONS ELSEWHERE

A feeder route about 1 mile long, on which a single trolley bus runs, has been in service in Minneapolis for about six months, and we understand that another bus is being built in the shops of the Twin City Rapid Transit Company. The first bus uses two railway motors and the automatic foot-operated control.

The Los Angeles Railway for several months has had one trolley bus seating twenty-nine passengers, equipped with two railway motors, and a foot-operated non-automatic contactor control. However, no regular operation has been attempted with it, and the operators have made no announcement of what they propose to do.

One bus has been running on a feeder route in Norfolk for several months, as an experiment to sound out the attitude of the public and city officials to the proposal of the Virginia Railway & Power Company that trolley bus routes be operated in several sections of the city. Negotiations are going on between the railway company and the City Councils in Norfolk, Richmond, and Petersburg for a fairly large use of these vehicles, which the railway officials believe to be well suited to the proposed service. If their plans mature, they will probably put about forty buses into service in the three cities during 1923. Two have been ordered for Petersburg, to give a similar demonstration to that now being given in Norfolk and which was also given in Richmond a year ago.

#### ROCHESTER PLANS TROLLEY BUS LINE FOR 1923

The city authorities in Rochester, N. Y., have recently granted the New York State Railways the right to construct a 5-mile trolley bus route, to serve as a crosstown connection for several rail lines. Six to ten buses will be required and operation will probably begin early next summer.

Several other railway companies in the Western and Southern states are now contemplating the use of trolley buses for extensions to their present

rail service, and installations will probably be made in a few months.

While the number of trolley buses yet placed in service on this side of the Atlantic is small, the results so far obtained have been encouraging to the proponents of their use. No excessive maintenance has developed; the electric equipment has stood up about as well as on rail cars, and the predictions that considerable economies in power and maintenance as compared to the gas engine drive should be secured have been verified.

In another year when the additional installations that are planned are in actual service, considerably more data should be available as to costs and performance. Longer experience may show, as some of us are beginning to think now, that the manufacturers of electric apparatus have been too conservative and have been over-motoring the buses and gearing them for too high a speed. A single-motor drive, with a simple rheostatic controller, may replace the double motor and contactor group that has been preferred by the majority of operators. More experimenting will probably result in an agreement on what type of collector, single or double pole, wheel or slider, should be standard. But the trolley bus, as an adjunct to the street railway, has come to stay.

#### Regulations for Federal Aid Roads Pending

ACCORDING to Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, the bureau's study of a full year's traffic over highways in Connecticut and other

surveys that are being made are for the purpose of formulating eventually regulations which are to apply on Federal aid roads. Another object being sought is a better basis for the determination of license fees for motor vehicles. Mr. MacDonald explained that uniform regulations for the entire country are not practicable. In a sparsely settled agricultural state, he said, heavy truck traffic should not be allowed. Trucks of a lighter type can be used where the chief need is to provide a good highway for passenger cars. In industrial sections it is advisable, he explained, to go the expense of constructing roads which will stand very heavy truck traffic.

#### Texas Line Uses Home- Built Bus

A NEW line between Port Arthur and Port Neches, Tex., is using the first bus body built in the southern part of Texas. This is mounted on a White chassis, as shown in the accompanying photograph. The body has space for eighteen passengers and weighs only 2,785 lb. It was built by C. Jim Stewart & Stevenson, Houston, Tex.

The framework is of hardwood with 3-in. angle-iron reinforcements for each sill and crossbar. The cross-sills are 4-in. angle iron. These are separated from the chassis frame by a 1-in. strip of hardwood, which breaks up the vibration and shock which would otherwise be transmitted through the iron sills. The roof panels are poplar, covered with 12-ounce white duck.



*Texas-built body mounted on White chassis*

# Comparative Deflection Tests Favor the Motor Stage

Pavement Deflections Observed on Test Road Under Truck, Touring Car and Stage—Static, Moving and Impact Tests

A SERIES of road tests have been carried out at Pittsburg, Calif., under the joint direction of the U. S. Bureau of Public Roads and the California Highway Department to determine the comparative amount of pavement deflection caused by several types of vehicles. A comparison as between the ordinary touring car, the typical motor stage with a load of fifteen passengers, and a solid-tired truck was made. The truck was exactly of the same total weight as the loaded stage. Each vehicle also had the same weight distribution on the front and rear wheels. The results of the tests indicate that a pneumatic tired 200-in. wheel base motor stage with a full live load of fifteen passengers causes less deflection in an 8-in. concrete slab than does a 2-ton 165-in. wheel base solid-tired truck of equivalent dead weight loading.

The accompanying series of curves in which the results are depicted graphically show that the deflections caused by the truck range up to a maximum of more than twice those caused by a stage of exactly the same

weight. Quite unexpected, however, also showed that the use of air pressure shock absorbers materially increased the pavement deflection when making the impact test.

Pavement deflections were read by the use of rods whose tops were embedded in the concrete pavement and

whose lower ends extended down into tunnels beneath the roadway, where movements of the rods were read accurately by means of micrometer gages.

Attention was first directed to the effect of shock absorbers when stages of the same weight distribution and differing only in the use of shock absorbers were tested. The results showed that the use of air pressure shock absorbers increased the pavement deflection when making the impact test. The use of normal air in the shock absorbers resulted in a maximum deflection of .005 inches, while the use of air pressure shock absorbers resulted in a maximum deflection of .010 inches.

The test was made by using a plank 2 inches thick and 4 feet long, which was placed on the rods and

Weights and Dimensions of Vehicles Used in Comparative Test

	Weight Lbs.	Wheel Base In.	Front Axle Lbs.	Rear Axle Lbs.
Chalmers Touring Car	2,400	165	1,200	1,200
2-ton Truck	2,400	165	1,200	1,200
Motor Stage with 15 Passengers	2,400	200	1,200	1,200

whose lower ends extended down into tunnels beneath the roadway, where movements of the rods were read accurately by means of micrometer gages.

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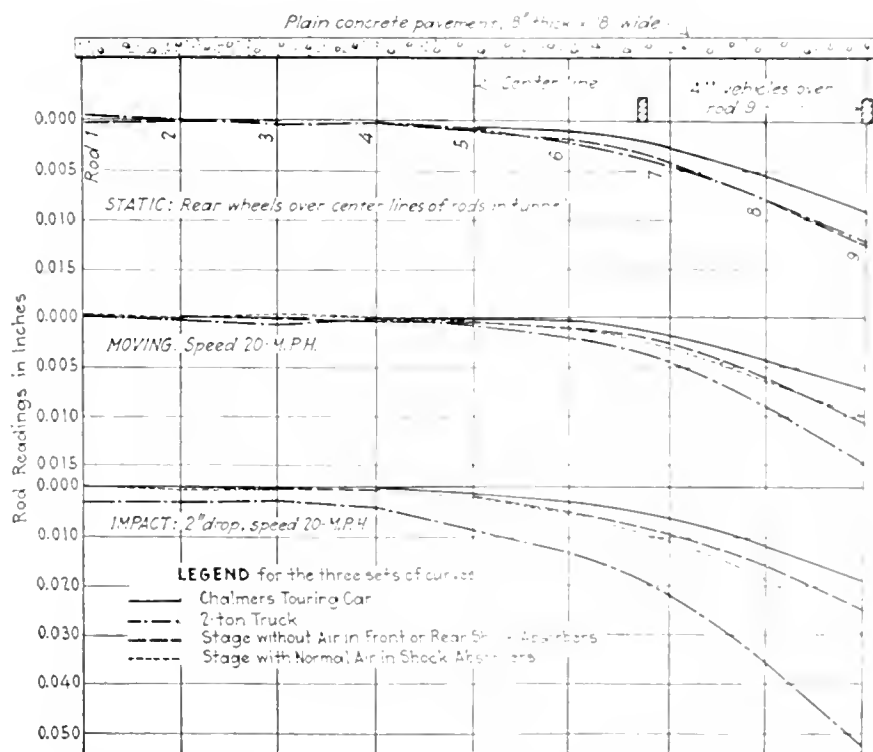
\*A detailed description of methods of making tests on this road was published in *Engineering News-Record*, Vol. 29, 1921, page 1618, and in the issue of July 29, 1922, page 1066; there appeared an extended report on the effect of heavy traffic on the concrete pavement.

distance from the deflection point until position were found where the vehicles passed over the deflection point and dropping to the road level again gave a maximum deflection for each of the several rods at which deflections were to be read. The edge of the plank presented to the approaching vehicle was backed off to a feather edge to allow the vehicle to rise up on it gradually. In all records shown in the accompanying curves, the wheels on one side of all the vehicles were kept over rod No. 9, nearest the pavement edge.

The curves shown herewith are typical of the several runs made and were selected to show, in a general way, the materially greater deflection of the concrete under the impact of a truck, even though its total weight and weight distribution were identical with the motor stage. The truck used was of the standard 2-ton type, with wheel base and spring equipment typical of a 2-ton truck.

Another point brought out by continuous traffic tests indicated that the surface wear on the test road due to rubber tires was negligible. For instance, after 3,000,000 tests, or 300,000 trucks passed over the road, there was practically no wear. The marks before the test were still plainly visible.

The work at the Pittsburg test highway was carried out under the joint direction of the U. S. Bureau of Public Roads and the California State Highway Department, with Lloyd A. Driscoll and John B. Leonard in direct charge of tests.



Showing deflection under impact and for static and moving loads

# High Spots in the Bus Industry

First Real Development Came in 1922—  
Coming Year Will Be Featured by Organized Capital  
and Better Service

**B**USES we have had for many years, but the bus industry as an industry was born the past year. Prior to 1922 it was difficult if not impossible to buy a real bus. The general conception of a bus in both the public mind and the operator's mind was a truck chassis, with a body usually put together by some local wagon builder. The year has brought forth a variety of real bus designs, chassis and bodies, designed, manufactured and sold by responsible manufacturing agencies. Certainly it is true that no great part of the public or even of the bus operators were in touch with these developments before this past year. There is no more striking evidence of last year's development in the bus industry than a comparison of the vehicles available today with those available twelve short months ago. What is true of the chassis and body alone applies equally to the parts, and equipment, and in some measure also to accessories. Bus terminals, except in a few isolated places, were practically unknown in 1921. Today they dot the map at every important transportation center.

It is only during the past year that the public has begun to recognize the existence of the industry by providing legislation for its regulation and protection. Prior to 1922 the man who invested his capital in a bus route was subjected as a rule to the unrestricted competition of any one who wanted to put his money into the same route. Now in many states the man entering the business secures assured rights that protect his investment as long as he performs his part of the contract with the public. This protection, while not yet universal, exists in some form in twenty-one states.

Public interest toward transportation by bus awoke during the past year. The old jitney was tolerated—the modern bus is welcomed as a luxurious necessity. The rubber urge, as it has been called, is well-nigh universal, and bus transportation has brought rubber tires into the life of the masses. The public has demanded more and more bus—the demand is still growing, and so long as the service given by bus oper-

ators caters to this demand the bus industry will expand.

The attitude of public utility operators toward the bus has changed—the leaders of thought in the electric railway field now recognize the place of the bus in the business of passenger transportation. They are changing from an attitude of hostility to one of open-minded receptiveness, and many of them realize that they must operate buses or work hand in hand with independent bus operators.

## KEYNOTES OF SUCCESS

The bus operator, too, has a broader horizon. He has begun to see that uncontrolled competition is as bad for him as for anybody else. He has found, for example, that competing with an electric railway may be less profitable than finding a route where competition does not exist. He has begun to see that the keynote of success in any part of the transportation business is in giving the public what it needs, and that co-ordinated transportation almost invariably meets the public demand. He has learned to work with existing transportation agencies, just as they have learned to work with him. During the past year the bus operator has developed into something more than mere running of buses—he has developed in sense of public service. He has found that regard for the comfort, safety and convenience of the public builds business and insures the future stability of his investment. While this is by no means 100 per cent true in the industry, the thought has been planted 100 per cent in the minds of the leaders of the industry and is growing among the others. The industry has begun to organize itself, local pools, county and state organizations have sprung up and taken definite form, and a national organization has likewise been formed.

The financial world has discovered the industry. It is no longer necessary for an operator to go into the business on a shoestring if he controls a legitimate bus enterprise. Capital on satisfactory terms can be secured to finance the development of sound bus businesses.

As we look back over the high spots of the year in our field, we cannot but marvel at the important developments that have taken place in so short a time. Not only has a great industry been born but it has grown amazingly. It has organized itself from within, and by its youthful soundness and vigor has drawn around it from without the organized forces which it needs for stability and progress.

Bus transportation has already gone far, but it has only just begun to go.

## GREAT PROGRESS PREDICTED

If we can judge the future by the past, 1923 will show progress that will make the surprising record of 1922 puny indeed.

With the public, the manufacturing field, the bus operators, the utility interests and capital all awake to the possibilities of the industry, only extreme conservatism can set an upper limit to its progress. Certain it is that the operator will see great strides on the part of equipment manufacturers, and the present stage of transition will develop well-defined standards. The bus of the future will better meet the conditions under which it operates. There will be more opportunity for discriminating choice in equipment. The intercity bus will be designed for intercity use, the urban bus for city use, the small town bus for small town use.

## WHERE GREATEST GROWTH WILL BE

Many more electric railways will operate buses in 1923. While this will work a hardship on some independent operators it will ultimately be a blessing in disguise to those who are sufficiently wide-awake to transfer their operations where they are needed. As a matter of fact, the greatest development will be in the communities now without rail transportation, where rail transportation never would pay. This is not saying that conflict between the rail and the highway will cease in 1923. It will diminish, but it will go on until the old law of the survival of the fittest settles the argument. The transportation facility which gives the greatest number of people the kind of service they want will survive. The bus never can completely supplant the electric railway, nor can the electric railway completely suppress the bus. Each has its legitimate field; time will fit each into its own.

One of the less startling developments, but perhaps one of the most important of all, will come through the dawning realization of the interdependence of all bus operators. There will be a more general realization of the fact that the industry as a whole can grow no faster than do the individuals that compose it. There will be more interchange of thought, a freer giving of experience for the common good, a growing desire to help, and by helping to

make the receiving of help possible. Such co-operation is needed to develop the best standards of practice, standards for measuring operating and maintenance costs, which involve uniform accounting system, and other cost accounting method. Such co-operation will give an impetus to studies of traffic flow and the fitting of schedules to traffic demand so that service can be given when and where it meets the common needs of the public and the operator.

The year before next we will see better buses and better operators. These will be operated under more effective and regular supervision. There will be a more general realization of the interdependence of the industry, and the larger part of the public.

The future of the motor bus is bright. It is a new type of vehicle, and it is a new type of service. It is a new type of public transportation, and it is a new type of public service. It is one of the most important of the new types of public transportation.

## Progress in Construction of Motor-Bus Chassis

*By Cornelius T. Myers*

**M**OBILE TRANSPORT—rapid, comfortable, and at times exhilarating. This is being furnished by the motor bus, and is being received with enthusiasm in all parts of the country. Steadfastly and consistently for some two years back the possibilities in this field have been urged on the motor truck industry by the National Automobile Chamber of Commerce, by the Society of Automotive Engineers, by the editors of automobile journals, by the operators of motor bus fleets, and by municipal authorities.

It is too early in the development of motor transportation properly to evaluate the progress or to say along just what lines the greatest trend of development will be. But one can say without fear of contradiction that there is now a general recognition of its possibilities by the public at large, and that this recognition is rapidly growing in street railway circles. The automotive industry itself has not only comprehended these possibilities, but has studied, labored and produced in a remarkably short time, vehicles to fill the requirements.

Motor truck builders have for years back turned out in small quantities modifications of their standard chassis that were more or less suitable for bus service, and for the time filled the demand that existed. One local transportation company over a term of years has designed and built vehicles which were particularly adapted to its service

After graduating from Stevens Institute in 1900 and holding engineering positions with several makers of mechanical equipment Mr. Myers became successively chief mechanical engineer of the General Motors Company, chief engineer General Motors Truck Company, and chief engineer the Timken David Brown Company.

In 1917, Mr. Myers, then a consulting engineer in Detroit, was made chairman of a committee of the Society of Automotive Engineers co-operating with the U. S. War Department in the design of the Liberty Motor Trucks. He is now a consulting automotive engineer, and is a member of such organizations as the American Society of Mechanical Engineers, Institution of Automobile Engineers of England and the Society of Automotive Engineers.

conditions, and which in connection with capable personnel demonstrated the great possibilities for bus travel in our big cities. Under the stimulus of repeated suggestion and urging, motor truck builders in all parts of the country have turned a large part of their attention to the production of chassis for mass-passenger transportation, with the result that there is on the market today a wide range of vehicles.

It is true that some of these chassis are but slight modifications of those which had been produced for motor truck service. But they have at least served the first demand, and where carefully operated they have demonstrated locally the advantages of bus service.

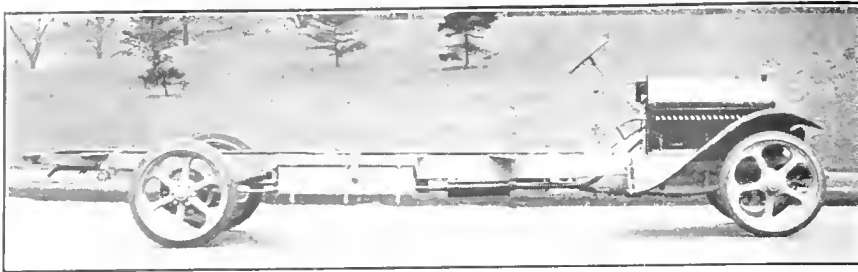
On the other hand, a considerable number of new chassis designed especially for passenger transport have been placed on the market, and others are either being completed or are well under way. Parts manufacturers have sensed the opportunities and have done splendid work in the development of engines, axles, gear boxes, etc., as well as motor details, all of which have been designed with a view to meeting the particular conditions of bus service, so far as these conditions could be determined.

### CHASSIS IS FOUNDATION

The body of a bus is practically all that the general public notices. But the chassis, with its thousands of details and its many engineering features, is the foundation of the job. In the chassis we find the result of the painstaking engineering study and experience of thousands of engineers in the automotive industry. With a large available fund of knowledge these engineers have put together various units and essential details in various ways, each endeavoring to produce a chassis that will give a desired performance under certain conditions or classes of service.

Local conditions will have a considerable bearing on the type of body and chassis to be used. Details, too, entirely suitable for one set of conditions might be of doubtful or negative value in other cases. It may even happen that if





*Straight frame construction on this Model 50 bus chassis (White.)*

all the details of a chassis are not the best suited to the conditions, or if they have certain undesirable features, an intimate knowledge of their limitations will point to a means of offsetting them to some degree. Skillful operation is half the problem in any event, but perfection of detail is essential to continued successful operation.

#### SOME FUNDAMENTAL DETAILS OF DESIGN

As to design features, we first note that the desire to draw customers and serve them well has developed the low-hung body with an easy step for entrance and exit. A number of details enter into the accomplishment of this important feature:

1. Both front and rear axles must be designed so as to permit the use of a low frame, and a generous spring deflection.

2. The rear portion of the frame should contain a "kick-up" or arch over the rear axle, to afford the spring action mentioned in the previous paragraph.

3. Wheels and tires of moderate diameter are necessary to reduce the height of the step.

A number of chassis now have the above features, some affording re-

markably low steps and body platforms.

Once a traveler has been picked up and is being carried rapidly toward his destination, our chief thought is for his safety. This is mainly accomplished by a low center of gravity, a wide gage and adequate controls—it being taken for granted that the various parts of the chassis are sufficiently strong to carry the loads for which it is designed. Here we must consider:

1. Brakes and their linkages. These must be absolutely adequate to skid the wheels under ordinary conditions, but be capable of smooth, easy and noiseless application. They must be durable and easy of adjustment.

2. Steering mechanisms must be durable and absolutely dependable, easy of operation, capable of short turns, and free from wheel wobble.

3. Pedals, steering wheel, levers and seat must be in proper relation to afford comfort to the driver.

4. Wide gage, low bodied axles are important for stability, seating room and short turning radius.

Double-deck and some high-speed buses have a wide gage, as well as a low center of gravity. These features should become universal in these types of bus. The wide gage and

small wheel also give a smaller wheel housing and better seating capacity over the rear axle.

#### CONSIDERATIONS OF COMFORT

Comfort for the passenger, when he is seated, is the next bid for bus popularity. In the chassis this is a matter of skillful design in combining and adapting the many features that enter into the riding qualities of the vehicle:

1. The type, size and quality of tires have a decided bearing on comfort.

2. The springs should be easily deflected for light loads and stiff enough to prevent bumping at full loads, but they should not be permitted to grow stiffer while in service.

3. Axles, tires and wheels should be of minimum weight.

4. The rear axle should be located fairly well to the rear of the body.

5. Gear noises, squeaks and rattles of all kinds must be suppressed as far as possible.

6. Engine vibration must be minimized.

During the past year there has been a marked improvement in chassis as measured by these qualifications. The problems involved are difficult and the ideal is still some distance ahead of us.

#### CUTTING OPERATING COSTS

From the standpoint of operating economy a long list of details can be mentioned, but chief among them are:

1. Light weight, because the maximum power required is a direct function of the total weight to be moved.

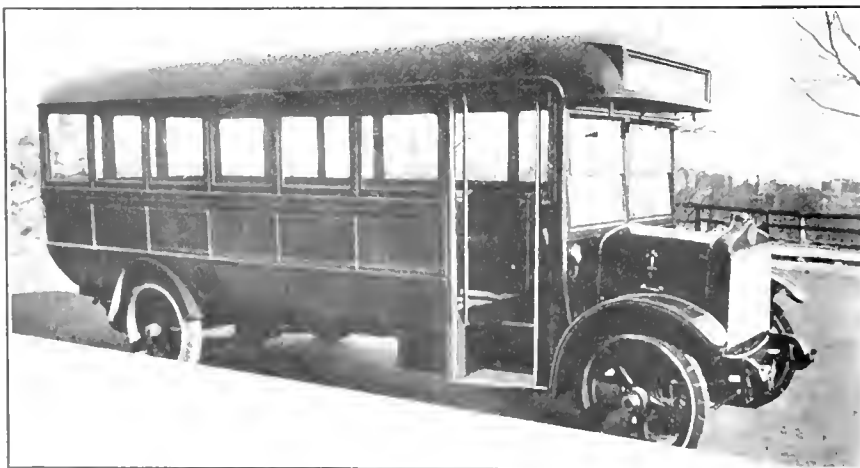
2. The proper relation of engine power, weight, tire size, and gear reduction must be established, and this is a difficult problem.

3. The over-all engine efficiency is of great importance and is affected by many different factors, such as average load, carburetion, internal friction, design characteristics and, finally, the skill and care with which the engine is manufactured.

4. The gear-box ratios must suit the operating conditions.

5. Clutch and brakes must be "easy," effective and durable.

6. Automatic lubrication of all parts where rubbing or sliding action takes place is very important. This will not only reduce attention costs but will reduce wear and repairs, and suppress many a squeak and groan.



*Single-decker for city service. (Fifth Avenue Type J.)*



7. The tires must be adequate in size and of a type best suited to the operating conditions.

In reviewing the chassis now on the market it can be said that though marked improvement has been made in the past year, there is still much to be attained on the score of weight reduction, on the relation of engine size to bus weight and speed, on engine efficiency, chassis lubrication, and some of the other points just mentioned. However, there are some notable exceptions which reveal well balanced designs, much careful thought and considerable initiative in execution.

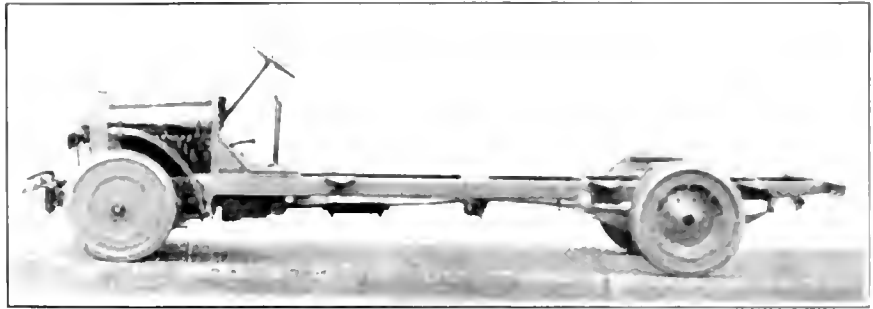
#### EVOLUTION OF BUS

Our buses are combinations, in varying proportions, in different conditions, of the passenger car and the motor truck, and the way for them has been laid by the wonderful development of these branches of the automotive industry in years gone by. First came the passenger car (at one time called pleasure car, and not always so pleasing, at that) and demonstrated the enormous value of swift, mobile, immediately available highway travel. Then came the motor truck to take up the loads of industry and apply to them the time-saving, cost-reducing element that its predecessor had demonstrated. Now, with the experience of both types of vehicles, we have the knowledge and experience that have enabled us to attack and solve the much more exacting service of moving commercially human freight. Without a doubt the past year has demonstrated this to the country at large.

Manifestly, for the good of all concerned, well recognized similar conditions should be served by equipment with similar characteristics, the component parts standardized as much as possible. Much knowledge and experience is already available on both sides, and the coming year will likely see it take some form as a basis for procedure.

#### ACCESSIBILITY

Accessibility in a motor bus chassis is of great importance, for when wear takes place and repairs have to be made, many valuable hours may be saved if the damaged parts can be reached with ease and replaced without disturbing others. It must be recognized that some parts are more exposed to wear than others. Certainly care should be devoted to protecting these as much as possible,



*Bus chassis with cushion wheels and clutch, steering gear, and other parts near rear axle. (Morton)*

but the design should render them easy of access for adjustment or replacement. Much attention has been paid to these features in motor truck construction, and recent bus chassis bear evidence that more and more consideration is being given to them. On many chassis, however, there is room for improvement in the arrangement of steering gear, clutch, and other parts near the rear of the engine. There is little enough elbow room here anyway because of the proximity of the dash and its equipment.

The pneumatic tire is the best type for bus service and it is coming into greater and greater use. For service at high speeds or over rough roads it has no equal, although the writer believes that the standard inflation pressures are too high to give the most comfortable riding. Except in the smaller sizes, however, pneumatics are as yet too expensive, and are too large in diameter to be widely used. The new sizes to be used with 20-in. rims overcome the disadvantage of large diameters. If they can be made to give greater mileage and at lower inflation pressures, they should come into extended use, except for large buses on smooth streets.

The cushion tire is rapidly gaining favor, and justly so. In combination with cushion wheels, cushioned springs or lubricated springs, it gives

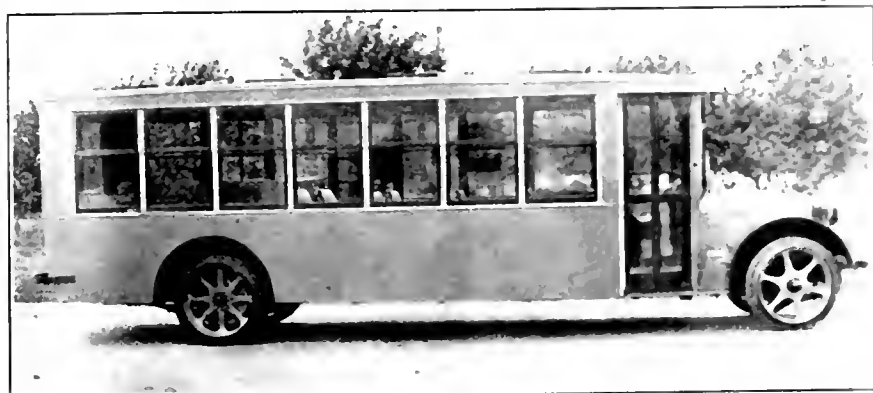
an effective means of giving the "grand" pneumatic with the right air pressures. So doing gives the lowest tire cost per mile, and for heavy buses on well-paved streets they afford very fair riding qualities with a well-designed spring suspension. The bus offers a big field for tire development, and doubtless the industry has plans now for giving us more serviceable tires.

#### UNSPRINGED PARTS

Cushion wheels are being used on several chassis, but they add weight at a point where it is best desired underneath the springs. Little or no reliable data on the actual service value of such wheels have been published, though many strong claims are made for them. More facts would be welcome.

The spring suspension is a difficult problem. On the latest chassis the springs are long, flat under load, and allowed as great as possible a clearance before "bumping" takes place. The compound spring with varying rates of deflection seems the best at present. One manufacturer holds the ends of the springs in rubber cushions to help damp out vibration; another supplies the springs constantly with very small amounts of oil, not only rendering them more flexible, but keeping them so.

The axles, front and rear, that are



*City bus to carry twenty-nine passengers in street-car type body. (Page 1)*

used for passenger cars or trucks, will in few cases best serve bus chassis. Some manufacturers have axles that are fairly suitable, some have developed special axles for their particular chassis, others have purchased specially designed axles from parts manufacturers. Front axles are low to keep down the height of the frame; they should be more carefully designed than the usual truck axle or they will not permit easy steering. The Elliott type is almost universally used.

Three types of rear axle are in use; worm drive, internal gear and double reduction at the axle center. Worm drive, with its advantages of silence, simplicity and ruggedness, is the most popular. Internal gear axles, affording low spring seats,

arrangements. A study of this should be undertaken for the benefit of all chassis and body manufacturers. It is a more complicated subject than appears on the surface, but the variations possible make it all the more important that something should be done on the matter.

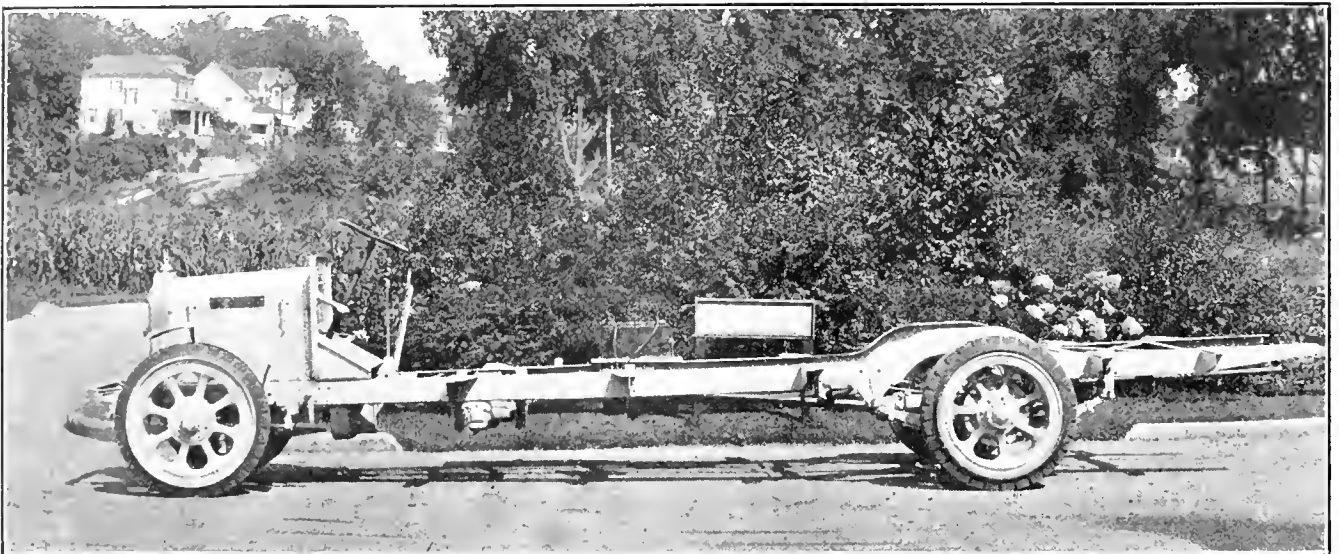
Steering gears vary considerably in type, and most of the types are represented in our motor bus chassis. The layout of the steering mechanism is of great importance. Many things besides the gear itself enter into the ease of steering and affect the life of the actuating parts. The accessibility of other parts may also be affected. Any attempt to discuss these features calls for an article in itself.

Brakes, too, are a large subject.

tend with. The single plate type seems to be most favored, although the multiple disk is popular. The single plate clutch scores on simplicity, low inertia effect, weight and ease of replacement.

#### TRANSMISSIONS

In gear boxes there is still a tendency to use whatever happens to be available in the way of construction and gear ratios. In many cases the available unit serves very well, but routes, schedule and maximum loads call for careful consideration in each particular case. There is but one instance of the use of silent chains in the gear box—all the rest being of the conventional spur gear type. One spur gear box offers seven speeds, and in a few instances these



*Goodwin-Guider chassis designed for bus service.*

smaller differentials, lighter centers and somewhat lighter total weights, come next. The internal gear type has become more popular due to improvements for retaining the lubricant in the internal gears, the use of better tooth forms, better detail design, and more accurate workmanship than has usually been accorded this type of axle in the past. Axles with the double reduction at the center have fewer adherents, but they are used by well known and substantial concerns.

#### CONTROLS

Controls must be simple, rugged, and as few as possible in number. Their arrangement will bear a great deal of study, and several chassis show the results of this. Sooner or later a considerable amount of standardization should take place, so that emergency drivers will not have to take charge of buses with unfamiliar

The accepted arrangements seem to be double brakes on the rear wheels for chassis under 25-passenger capacity. For chassis above this capacity a pair of brakes on the propeller shaft and another set on the rear wheels finds more favor. For high-speed buses the front wheel brake offers possibilities if simple and effective operating mechanisms can be developed.

One high-speed interurban chassis, which is one of the notable developments of the year, is equipped with air brakes. This seems like adding complications to a chassis, but in view of a speed of 50 m.p.h., more than a comfortable effort on the part of the driver is necessary in making a sudden reduction in speed.

The clutch of most motor buses has unusually hard service to con-

might be useful. Three, or four speeds at most, will cover nearly every requirement, however, and simplicity recommends them. The lubrication of gear boxes is a subject that will bear some discussion, but at a later date.

#### ENGINES

To discuss engines and their accessories is out of the question in the present article. Both poppet and sleeve valve engines are used in bus service. That either will predominate in the long run is unlikely, for the development of engine details is constantly taking place and no one can predict which type will improve the faster. Very reliable and efficient engines of both types are in service. The four-cylinder engine has the advantage of the six-cylinder in weight, space occupied, friction losses, fuel economy, repairs and first cost. The six-cylinder engine

is smoother running than the four-cylinder.

In general, many features of chassis design will be influenced by what the public will pay for the service rendered. The two most notable offerings of the year—one at the

Atlantic seaboard and the other at the Pacific—have been based on the belief that Americans will pay any reasonable sum for a road service well rendered. They show pains-taking effort to cover essential requirements, and at the same time

take a forward step in automotive transportation. In both, the chassis and body are well considered, and though they differ in appearance and detail each is a well-considered effort to afford more rapid and safer travel.

## Bus Bodies Took Big Forward Strides in 1922

Two Types Well Defined—Many Details Improved—Notable Advances in Lighting and Heating—Seating for Traffic Requirements—How Beauty Helps the Bus—Enter the Assembled Body—Working Toward Standardization—A Look Ahead

**W**HEN BUS TRANSPORTATION was started, one year ago this month, the body-building part of the industry was in the A B C stage. Good bodies were being made, it is true, and these have proved a foundation. But in general the bodies sold a year and more back were only a beginning. They included the barest essentials, what the body makers call the shell, but it was largely up to the bus operator to finish the job, and install the fittings and equipment required for a complete unit of transportation.

During the past year there have been great improvements. Such fundamentals as the framing, panels, roofs, have been put together to give better service. More important is the progress with fittings or body equipment. At the service of the operator are now a host of devices designed for the bus body. It would be foolish to say that devices for providing light, heat, ventilation, and for fare collection, are perfect. There is still much to be done with these and other essential fittings. What has happened in 1922 is that the work of many specialized manufacturers has been made available to bus operators.

Body builders now have much more to do than finishing a shell. Their work also includes the assembling of many different types of equipment, supplied either as part of the standard construction, or as extras at the demand of the man who acts in response to the needs of the riding public.

As a vehicle for local transportation, the bus has two ancestors. One

is the trolley car, relatively slow, of sturdy design and to a considerable extent collision-proof, built for frequent changing of load, and for use in crowded city streets. The other is the pleasure automobile, of comparative light construction, and designed to carry the same passenger load at high speed for long distances.

Bus bodies particularly show traces of descent from both these ancestors. In fact, there are now two well-defined types, which stand apart mainly through their method of handling passengers. The clear-cut recognition of these types, which we may call the street car and sedan, is one of the outstanding events of the past year. Development of bus business, in different localities and under different conditions, has forced this recognition on the operators, and the body builders have of necessity followed the lead of their customers.

Each type is built in many sizes, and with important differences in construction. But each has its own fundamental characteristics.

The street-car body is designed for frequent interchange of passengers, with a service door at the front for passengers, an aisle the full length, and an emergency, or sometimes a service, exit at the rear. As shown in the drawing on page 19, the seating arrangement varies with the nature of the business handled. This type is for work in densely settled districts, on routes limited in length. It must possess certain details of construction, as has been realized more and more during the past year. Strength was a feature of 1922 street-car bodies. Turn under or

swell sides to gain clearance of traffic, rub rails and bumper for protection from the trolley car and motor truck crowd—these are some of the details found essential and incorporated in recent designs.

The sedan body provides a seat for every passenger. A development of the closed automobile, it is essentially for long distance travel. Seats as a rule are of full-cross construction, each with at least one door for passengers. Features are the upholstered seats as used in the sedan, or limousine type of automobile, and facilities for carrying light baggage. The sight-seeing element often enters, so that recent designs have sides with a high proportion of observation area, which can be thrown open during good weather. Since the sides, sometimes both of them, are practically all doors, it has been found necessary to take door control from the passengers. In one of these bodies a system of levers connects all the door handles to the front, where only the driver can operate them.

These outlines give the general characteristics of what have been termed the street-car and sedan types of bus bodies. In many respects the two types are similar, so that in the following review it is proposed to discuss such matters as framing, panel materials, roofs, lighting, heating, ventilation, seating, and fare collection, for the two types, and to point out the outstanding developments of the past year.

Under-frame construction to secure low floors, and all-steel frames are undoubtedly the most important de-



*Fageol Safety Bus in Western stage service*



*Packard Twin-Six, with sedan-type bus body*

velopments in the foundation of the bus body. By building the longitudinal sills into the floor, and using metal extensions riveted to the frame members, it has been possible to keep the platform level down so that it is only the thickness of the floor above the frame.

All-steel framing, built up of structural angles or channels and pressed-steel posts, is the result of the entrance of rail-car builders into the industry. This construction conforms in its general details to that developed for electric railway rolling stock, and has the advantage, it is held, of safety, strength and durability.

Even when the conventional hardwood is used for the greater part of the framing, there is a tendency toward a composite construction. Structural steel sills are alternated with those made of wood, and roof bows and sills even are plated with steel strip, to secure the strength of the metal and the deadening property of the wood. Or an underframe of steel may be mounted on a hardwood strip, to break up vibrations and shocks that might otherwise be transmitted from the chassis to the body.

Better floors were shown on many

bodies. An example is a floor half lapped to keep out dust and fumes, but with a slight clearance between the boards to allow for expansion due to weather conditions. Wear is kept down by safety tread on the steps, and by grooved (slatted) boards in the aisles of street-car bodies. These may be covered with linoleum under the seats, although carpet is being used for sedan types.

#### IN ROOF CONSTRUCTION

The tendency is toward the arch form of roof, although a modified

*Mack bus body during construction. Metal corner braces shown.*



monitor or cupola construction is sometimes used, on account of its ventilating possibilities. The cupola roof as used on street-car bodies has small windows on the sides only, and sweeps down in graceful curves to join the main part of the roof at the front and rear. Many of the present-day buses are fitted with stanchions, attached between the roof bows and the floor. These may prevent the adjustment of the roof to contortions caused by road inequalities, but are useful when standees are the rule. Where good illumination is needed, it is becoming the practice to line the ceiling with a wood veneer or composition material, which can be painted to give a smooth surface that will reflect light efficiently.

For sedan types, especially in smaller passenger capacities, a padded top is used. Roof bows are covered outside with duck, and inside with velour, whipcord or motorcloth to harmonize with the upholstery.

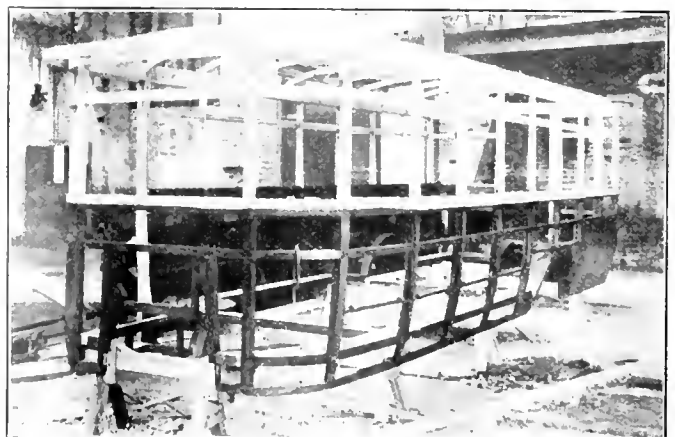
#### PANEL MATERIALS

The table accompanying this article indicates that sheet steel is the panel material used by the greatest number of bodies listed,

*Frame of body shown at left, with posts and roof bows in place.*



*Shell of thirty-passenger Model bus body, ready for chassis.*



with sheet aluminum, wood veneer, and fiber board following.

Progress in panel materials during the year has consisted mostly in the direction of their application—better painting and better insulation. Outside the steel sheets are sand blasted, and treated so the paint will stay put. Success in this, it is said, is due to the combined efforts of the body and paint makers. Inside the sheets are also being given better care. One builder uses corkboard covered with linoleum. The corkboard is cemented to the inside of the panel plates, and is intended to prevent rumbling or squeaks. This coating may also serve as an insulation, to retain the heat in the body during cold weather. Other forms of wadding, or wood veneer, may be used for the same purpose.

#### DOORS AND WINDOWS

Opening and closing the bus door has been receiving considerable at-

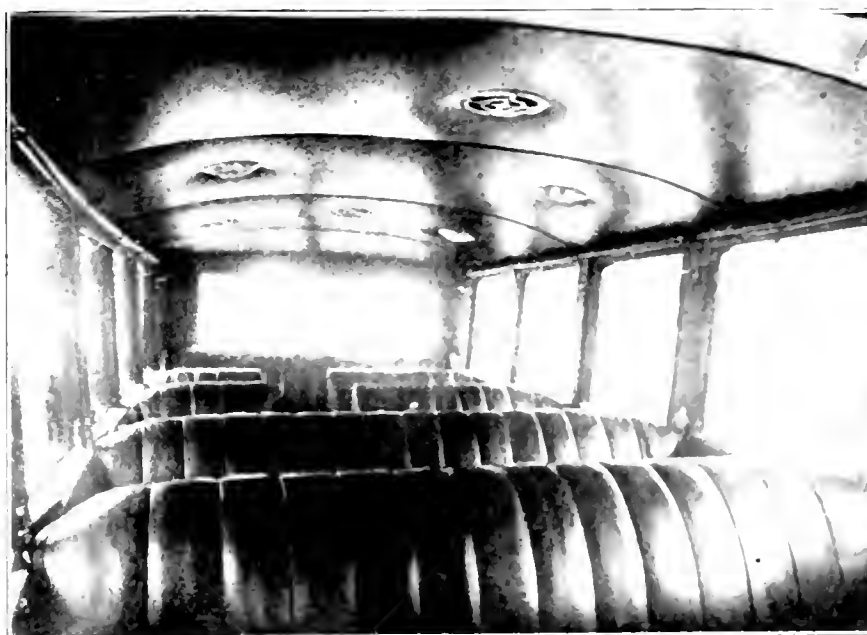
#### *Interiors of typical bus bodies.*

*Top—Street-car type, with cross seats. Lighting from bowls in advertising racks. Seat backs aluminum. (American.)*  
*Center—Another street-car body for trolley-bus service. Open lights, Pullman windows, seats to form landing well at front. (Brill.)*  
*Bottom—Do here example of sedan-type body. Dome lights, ventilators, clothes hooks on side posts. (Borden.)*

tension, with more needed, and to come. The perfect door-opening mechanism has yet to show its head, although some creditable designs have been developed during the year. If the operators are any judge the tendency will be toward simplicity, light from overhead on the step, and a solid lower panel in the door. The step light works—sometimes. The wireglass lower panel has proved of no great utility, and it is too often broken.

When it comes to doors for the sedan-type bodies, closed automobile construction has led the way, and still is followed to a considerable degree. Something stronger is needed, however. Solid-framed doors, working on triple offsets, with handles inside and out to assist the passengers entering and leaving—these appeared last year on a few jobs. Another feature, already referred to, is designed to prevent passengers opening the doors when the vehicle is in motion. The driver may do this by a system of levers, or by a key for each door.

The old year saw many detail







improvements in window construction. In many street-car models the campaign for quiet operation has been directed to both glass and sash. Glass is set in felt, rubber or in metal sash to eliminate rattle and breakage. Anti-rattlers are used to hold the windows tight at any position and thus overcome sash rattle.

So much for the general details of body construction. In addition there are to be considered the high points of such matters as lighting, heating, ventilation, and seating arrangements.

#### ADVANCES IN LIGHTING

The lighting inside the bus, particularly the street-car type, has furnished one of the notable advances of the year. Interior lighting, of course, is not purely a body matter,

should not be provided, but so far it seems that the traffic and schedules have not made it necessary.

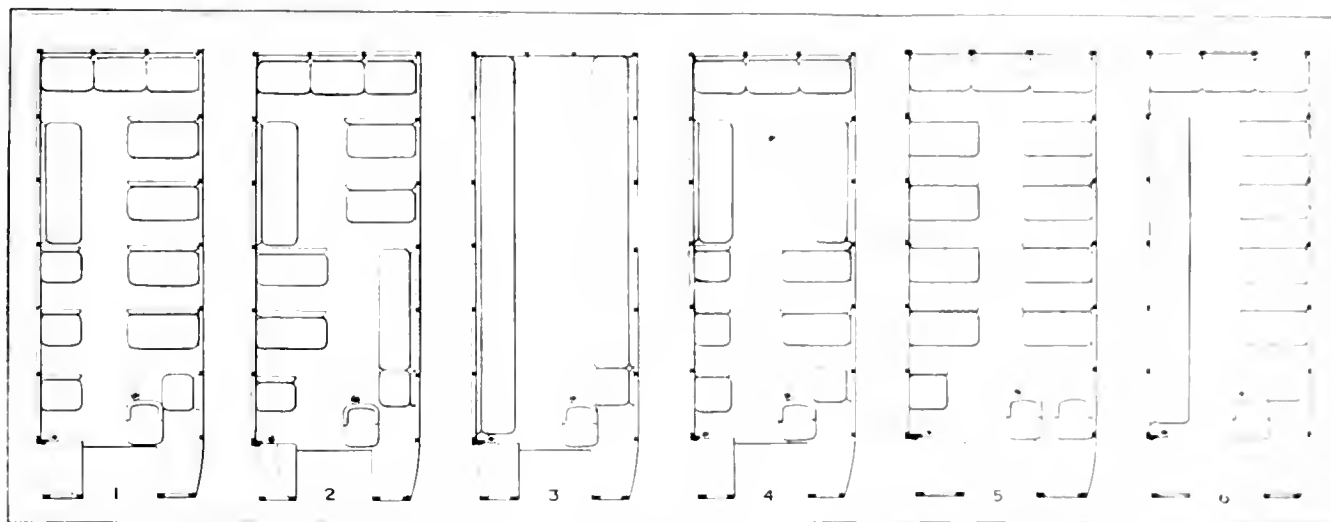
There is a tendency to relieve the lighting system, or rather the source of the current used for lighting, of part of its work. Some operators prefer a separate dry battery for the passenger signaling system, or to substitute a mechanical arrangement. Many new buses have a gove placed over the driver's head, which passengers can ring by pulling a cord carried along each side of the body.

Heating also has advanced. A year ago operators were often compelled to install home-made systems, to get sufficient capacity. Now the market affords several types of heating devices, in adequate sizes. One can buy a piping system complete,

of automatic ventilation mounted along the center line of the roof, with outlets projecting above, and a grill or register in the ceiling. These require no adjustment for rain, snow or wind.

#### SEATING ARRANGEMENTS

Several typical arrangements of seats are shown in the accompanying drawing. They include the three general types for street-car bodies: two longitudinal seats for frequent stop, standard or corner seats placed uniformly on each side of a straight central aisle for the longer trips; and a combination of the two kind of seat for service of mixed character. One of the steps forward of 1922 is the better selection of seating arrangement to meet traffic requirements.



*Seating layouts for street-car bodies. As suggested by Bus Body Corporation.*

since the source of current is tied up with the chassis. But our friends the generator makers have begun to turn out units of large capacity, so that something more than a few 4-cp. bulbs, plus the essential exterior lights, can be kept going. The illuminating engineers have also interested themselves in the subject, and fixtures have been developed suitable for use on even the largest bodies. The frosted domes, or the various types of reflectors, mounted with 16-cp. or larger bulbs on a polished ivory or white ceiling to get full value from the lighting system, now provide even reading light, in spite of road vibrations.

Lighting in the sedan bodies is usually a safety measure, with a fixture overhead or at the edge of each seat, for passenger use during exit and entrance. There is no reason why the ceilings should not present a surface to reflect light, and why sufficient illumination

with steel tubes, straights, elbows and couplings, valve and control mechanism, and even the perforated guards to protect the passengers.

The bus requires larger units than those used for pleasure automobiles, and these are supplied in the heel-board type for street-car bodies, and in registers set flush in the floor of sedan installations.

A recent development is the use of hot-water heating in buses, instead of the exhaust type. The new systems consist of pipe coils, fed with hot water tapped off from the outlet of the engine cylinders.

Ventilation and heating go together, although the former must act to remove gaseous or fuel fumes in warm weather when heat is not required. Perhaps the most interesting development is the wide use

Sedan bodies use the seat as braces to support the sides, which would otherwise consist of independent pairs of posts, tied perhaps by a light roof. These seats are often open underneath, giving space for legroom and for luggage. The double-deck springs, covered with imitation leather or fabrics, follow a rounded line.

#### BEAUTY AND THE BUS

The appearance of the bus has received a great deal of attention during the first year of BUS TRANSPORTATION. The efforts of this are shown both in structural form and in the color schemes, inside and outside. Carefully studied has been the value of appearance in getting business, as well as its effect on design and maintenance.

Advance in structural form is most commonly indicated by the turnunder body. The straight-line design is light in weight and easy

to build, but it looks like a plain box set on wheels. Appearance is much improved, however, with a moderate turnunder or swell at the sides and rear. The turnunder has practical value also when the bus works in heavy traffic, since rub-rails can be used to take the blows of colliding vehicles, and the added clearance is valuable.

Front covers are being made with curved quarter lights or with windows set on an angle to remove the square effect. This construction makes for better looks and also gives the driver a better view at the sides of the road. Another detail in construction typical of many street-car bodies is the metal skirt placed around the lower edge of the body.



*All-steel frame twenty-five passenger body. Kuhlman, on Pierce-Arrow chassis*

Long skirts are not yet the fashion on all buses, but where applied they hide the underneath mechanical parts, and the body looks lower and closer to the ground.

The interior finish of street-car bodies is showing signs of settling down to a mahogany or other dark trim up to the top of the windows, with the ceiling in light oak, ivory or white, to give the best light-reflecting surface.

The color schemes for the outside are tending to become somber, or at least restful, in their effect on the eye. Bus men who take advantage of every business-getting refinement are passing by colors of the alarm-clock variety. The call of color is not required with vehicles operated on a time schedule. Dark finishes, especially at the top of the bus, blend easily into the background, usually somber or neutral in tone. This has the advantage that it keeps the body from looking top-heavy, and so it appears safer to the passengers.

A finish developed for pleasure automobiles has recently been applied, it would seem to advantage,

on bodies of the street-car type. It consists of a leather substitute material, supplied in a variety of colors, which is cemented to panels, roofs and other exposed parts. This finish, it is claimed, keeps its appearance and form for years under all kinds of weather and road conditions. It will not check, crack, or chip off. The application is comparatively simple: first, the body is thoroughly cleaned, and then the material is smoothed on, using specially prepared cement.

The body builder contents himself with furnishing certain essential fittings that enter into the construction, and adds others according to agreement reached with the buyer-operator. Thus interior lighting

fixtures, buzzer system, advertising racks, windshield, heating and ventilating equipment may be installed, although the two last are extras on many of the smaller bodies. On larger bodies, there may be furnished running lights at the front, danger signal at the rear, rear-vision mirror for the interior, curtain back of the driver, tool box under seat of body, and tire carrier at rear. Classed as extras as a rule are illuminated route signs, windshield cleaners, fare collection devices, window guards and curtains, and baggage carriers.

#### FITTINGS OR DETAILS OF EQUIPMENT

The very use of all these fittings is a sign of the better service given by bus operators. And the majority of them have been devised particularly for use on the bus. Here is an indication of the varied mechanical ability and the wide manufacturing experience brought into play by the growth of the bus industry.

The year 1922 has seen great advances in the construction of bus bodies. Some of the evidences of this progress have been referred to

briefly in the foregoing paragraphs. Now to consider the effect of the large increase in number of bodies produced, undoubtedly the largest in any twelve-month period to date, on builders' methods and organizations.

#### WITH THE BODY BUILDERS

There are two distinct and separate tendencies that appear from a study of 1922 activities in the industry. The first is the production, in a single shop, of bodies in quantities. It would be a mistake to say the production of identical bodies in quantities, for even the large builders must maintain a considerable degree of flexibility in their designs, so they can fit a variety of chassis from different sources. These large builders have been successful in adapting modern manufacturing methods to the construction of bus bodies, to the extent that only a small amount of special fitting is required for each chassis.

The second tendency, to be discussed presently, is the assembling, usually in a small shop, of up-to-date bus bodies. There is no clear line between the two types of bus production, any more than there is in the automobile industry where the same or similar tendencies have been at work for a number of years. But we can at least survey some of the causes and effects that accompany the two tendencies.

Quantity production has been worked out to the greatest extent by builders who concentrate on a small number of chassis makes. It is then possible to make up so-called standardized units or parts, such as posts, sills, windows, doors, and hold them in stock until orders are received. The operator can suit his own taste in details of equipment, and still get the benefit of the lower costs that are secured. Another advantage, still to be realized, is that the standardized parts may be supplied for repairs at a price that will meet the competition of the local carpenter or body maker.

By thus building bodies for a given chassis, the job of fitting and mounting is enormously simplified. Done for one chassis, of course, it is done for all. Under-frame construction, fit between dash and chassis hood, correct load distribution, these can be settled with the requirements of chassis and body given due consideration.

The quantity methods of production have worked out well when the



body maker is in the same locality as the chassis factory, or within driving distance of the operator's route. With the present high freight rates a drive of several hundred miles is often considered the best method of delivery. When chassis and body are made in the same place, then the complete bus can be shipped by freight at practically the same cost as the chassis alone.

It has been said that one of the tendencies shown in 1922 was the assembling of bus bodies. Like his brother in the motor-truck field, the builder of assembled bus bodies is in a strong position to specialize, and make a body for this chassis today and for one entirely different next week or month. He has every opportunity to put good workmanship into his product, and to develop and use his own special features of construction. All the materials and specialized fittings are his at a reasonable price, perhaps higher than the builder who buys them in quantities, but still within bounds.

#### A LOOK AHEAD

Nineteen-twenty-two has not revealed any radical changes in construction or in method of manufacture, at least as measured in terms of commercial production. A number of such developments have been tried out, with results that only the test of wide use will determine. Among them are the application of a special body built for light-duty service, so as to fit a remodeled truck chassis of a widely used make; a take-down design, also for light-duty service, consisting of units that can be assembled where the body is to be used; and finally a single or joint frame structure for chassis and body, in which the present chassis frame members and the body sills and posts will be combined in the one unit, up say to the lower edge of the windows.

Perhaps the most important development of the last year, certainly the most far-reaching, is the general tendency toward body standardization. This does not mean that bus bodies are all alike, or that they ever will be, in passenger capacity or in details of construction. But there is evident a remarkable similarity in bus bodies, a definite recognition that there are a fairly small number of kinds of service, and that these can be adequately satisfied by a comparatively few types of bodies.

It means undoubtedly that the experience of thousands of operators, all over the country, is beginning to crystallize into definite requirements of construction. The process is not starting, but already it has gone far beyond the condition "gone far," for it be said, in a short time, when each and every body was a distinct and different example of the art.

If the experience of other businesses can be taken as a guide, then types or designs will become fewer in number, so that each one can be turned out in larger quantities. This is a movement that will come more and more as bus transportation grows. The industry will thus be the cause of, and will also be the gainer from, the kind of standardization that can be passed on to the operator in the form of lower prices, lighter weights, better quality, and greater durability.

### California Line Maintains Hourly Service

THE Santa Rosa-Petaluma-Sausalito Auto Stage Company, uses twelve buses to furnish hourly service over a 50-mile route. The territory includes a number of small towns in upper California, from the city of Santa Clara to the town of Sausalito, across the Golden Gate from San Francisco. The roads are good concrete throughout, but with many hills and turns. In one stretch of 12 miles there are 163 turns.

The schedule provides for a bus every hour from Santa Rosa, this arriving at Sausalito two hours and fifteen minutes later. The first southbound bus leaves Santa Clara at 6:30 in the morning, stops at the five towns en route and makes the trip in two hours. Two hours' stoppage is required.

Returning to Santa Rosa, the bus leaves Sausalito at 10:00, arrives at Santa Clara at 12:05, the next morning. For Santa Clara and Bolinas, a special trip is made, leaving Sausalito at 12:30 in the morning. The round trip fare is \$2 with \$1.10 rate one way, and a 25-cent minimum fare.

The bus terminal at the Union Stage Depot, Santa Rosa, is reached by another line, which makes four round trips a day inland to Sausalito. The two lines put out a joint time-table, showing schedules and connections at different points with other bus lines.

The interior of the Santa Clara Union Stage Depot is shown in the accompanying view. The bus enters through the depot building, which is located on a corner, and take passengers directly from the waiting room. The building is one story high. Separate ticket offices are provided for the two lines, and the waiting room has a stand for magazines and for soft drinks, and a checking room for baggage.

The equipment used on the Santa Clara-Sausalito line consists of twelve Model 15-15 White buses.



Inside loading of passengers the rule here. Interior of Santa Clara Depot

## Requirements for Highway Construction

Government Engineers Study Traffic Conditions—  
Widths Should Vary with Speed of Vehicles—Shoulders  
Recommended for Adjustments or Repairs

PROPER widths on straightaways and on curves, types of shoulder construction necessary, and the general methods of building Portland cement concrete roads are taken up in bulletin No. 1077, prepared by engineers of the Bureau of Public Roads, and issued by the Department of Agriculture.

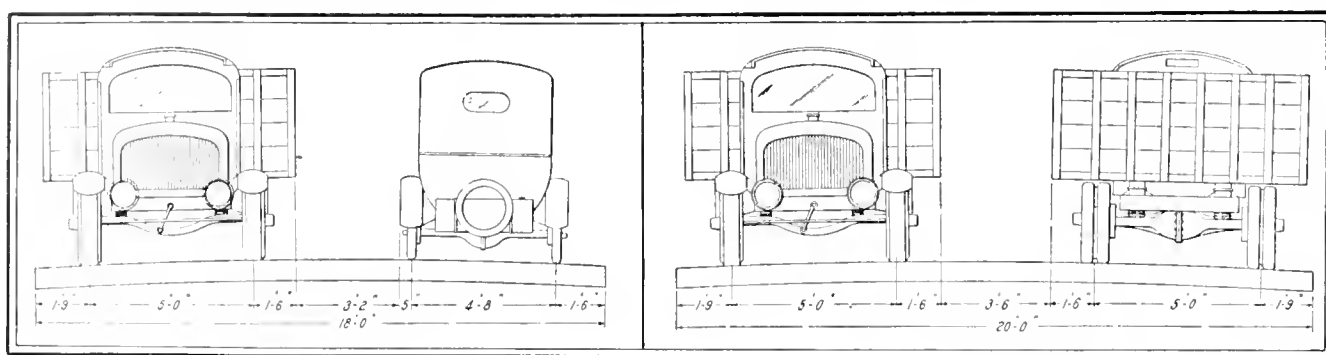
All trunk line roads and roads of primary state systems, according to

the minimum width of pavement should be 20 ft. Layouts of two roads are given in the accompanying drawing.

The thickness of pavement required depends upon the traffic. For average conditions of soil a thickness of 8 in. is believed desirable for traffic up to and including 150 trucks per day. Near large cities where a large volume of heavily-loaded truck

the added width should be consistent with the provision that has been made on the straightaway portion. A greater factor of safety is desirable on curves, so that if the clearance allowed on the straight portion is from 3 to 3½ ft., it is believed that a minimum of 5 ft. should be provided on the curves. It is now generally agreed that the increased width should be added to the inside rather than the outside of the curve and that it should continue for practically the entire length of the curve.

Shoulders should be not less than 5 ft. wide, and 6 or 7 ft. is preferable. On single-track pavements they should be wide enough to provide for



the bulletin, should be constructed to accommodate two lines of traffic, whether the necessity for such a width exists at the time of construction or not. When funds are the controlling factor, it may be desirable to construct a single-track pavement and make provisions for widening it later when the volume of traffic justifies the expense.

The character of vehicles, together with the clearance necessary for safety in passing, will largely determine the width of pavement for double-track roads. For slow-speed traffic, such as trucks, a clearance of 3 to 3½ ft. is necessary for safety, while for high-speed automobile traffic at least 5 ft. should be provided. At an average speed of 30 m.p.h. it is unreasonable to expect the driver of an automobile to drive with the wheels closer than 1½ ft. to the edge of the pavement. For trucks at an average speed of 15 m.p.h. this distance should not be less than 1½ ft. on account of the great width of the rear wheels. Inasmuch as a certain amount of truck traffic is to be expected on all main country roads, the minimum width of pavement for this class of road should be 18 ft. Where the frequency with which trucks pass each other becomes a big factor, as in the neighborhood of large cities,

*Widths of road required for safe passage. View at left, passenger car passing truck. View at right, truck passing truck.*

traffic is to be expected, the thickness should preferably be 9 in., and under very unusual conditions a thickness of 10 in. may be necessary.

On curves the roads must be widened because the vehicle occupies a greater width of pavement than on straightaway. In widening curves

safety of passing vehicles and must be composed of material which will support them satisfactorily. On a double-track pavement the shoulders should be wide enough to allow for irregular and unexpected actions by inexperienced drivers or frightened animals. Where the volume of traffic is large they should permit automobiles to turn out onto the shoulders for minor adjustments or tire repairs without blocking the traveled way.

## Conductors' Badges Proving Effective

THE neat green and gold badges on the breasts of the Fifth Avenue coach conductors are beginning to show their value in promoting better relations with the public.

"It's this way," explained one of the conductors the other day, "the passenger who wants to be pleasant, and the one who wants to kick, both find the name plate convenient. People use conductors' names all sorts of ways. One will ask: 'Will you please let me off at the next corner, Mr. Jones?' Then there is the woman who wants to ask a favor, such as being let off in the middle of a block near her front door. She begins by saying, 'Mr. Jones, may I trouble you just this once to stop,'

etc. The passenger seeking a privilege usually makes sure of your name plate right away. If he is particularly mad he drops the Mr. 'See here, Jones,' he says. 'I'll report you for this.'

"What proportion of them mention the name? Just now I should say there was about one to every coachful, say fifty passengers. But the regular customers are beginning to catch on. After they get to know us they usually smile or nod. Later they will wish us a 'Good morning,' or a 'Good night.' Since the name plates have come in they add our names, 'Good morning, Mr. Jones,' and more of them are doing it every day."—*The New York Times*.

# New York, London, Paris and Berlin Bus Conditions Compared

**T**WO extended reports on transit conditions in London, Paris and Berlin as compared with those of New York have recently been submitted to the New York Transit Commission. One is by Daniel L. Turner, consulting engineer of the commission, and is based on observations made by him during a trip last summer. The other, which includes also comments on transit conditions in Glasgow and Hamburg, was submitted by Robert Ridgway, chief engineer of the commission, and is based on a trip made by him during the summer of 1921. An abstract of Mr. Turner's report, in so far as it relates to rapid transit lines and tramways, is being published in current issues of the *Electric Railway Journal*. The following facts in regard to bus transportation are taken from Mr. Turner's report and the maps showing the bus routes in London and Paris are from Mr. Ridgway's report.

In New York, London and Berlin double-deck buses are operated. In Paris they are all single-deck buses. Paris operators seem to think that the double-deck bus requires too much time to load and unload from the upper level. The double-deck buses are not permitted on the Paris system. In New York, and possibly in some of the other cities, the bus lines are experimenting with closed top buses and the Fifth Avenue Coach Company is experimenting with a single-deck type of bus. Just as is the case with the tramway cars in London and Paris, the lines all stop at designated stopping points to load and unload passengers. In New York all buses stop at every cross street, but they stop at the far side of the crossing, not at the near side, as the trolley cars do. At the stopping points in London and Paris, the same kind of information with respect to the operating routes is displayed as in the case of the tramway lines—that is, the number of the routes stopping at the particular point are indicated, and in Paris numbered tickets are used to permit each passenger to board the buses in the order of his arrival.

## This Is an Extended Review of Reports to the New York Transit Commission, Based on Recent Inspections—The Extent of Bus Service and Methods of Operation in These Large Cities Are Compared

The capacity of the double-deck buses used in New York is fifty-one seats, and no standing passengers are permitted. In London, the seating capacities of the principal types of buses are thirty-four, forty-six and fifty-four respectively, and five passengers are permitted to stand. In Paris the single-deck buses seat twenty-eight, sixteen first class in the front of the bus and twelve second class in the rear, and permit ten passengers to stand. These passengers, however, all have to stand on the platform of the bus. The Paris buses are peculiar in that passengers do not board and disembark by means of a side step, but by means of a step on the rear of the platform. It is almost impossible, therefore, to get off a Paris bus while it is in motion. Paris has developed a successful six-wheel bus. A number are now being built. It is a single-deck bus, and it carries twenty first class, twenty second class, seated passengers, and eight standing, a total of forty-eight passengers. Its general plan is the same as the four-wheel vehicle, but its capacity approaches the New York and London double-deck buses.

In Berlin the buses seat thirty-six and six are permitted to stand below.

On all of the bus lines, therefore, except in New York, that is on those in London, Paris and Berlin, a few standing passengers are permitted, but the number is limited. There is some advantage in this, in that it gives a passenger an opportunity to get on a bus and in a very few blocks obtain a seat. Frequently it has been noted that the Fifth Avenue buses refuse to receive passengers at one stop, and at the very next

stop will receive three or four passengers. Two or three passengers might be permitted to stand on the rear platform of the Fifth Avenue bus, without creating inconvenience to the other passengers.

The speeds on all of the bus lines do not differ materially from those on the tramway lines. Their average speed must conform to the general traffic conditions in the streets traversed. The Fifth Avenue bus routes do not operate all through the night. It is the only transit service in New York that does not furnish all night service. The service is shut off from 2 a.m. to 6:30 a.m. In London the operation is suspended on the bus line from midnight to about 7 or 8 o'clock in the morning. In Paris it is suspended from 1 o'clock to 6 o'clock in the morning. The practice in Berlin is not known.

There is one other important feature of the bus operation in London which must be mentioned here, and that is the Chiswick works of the London General Omnibus Company. These are the overhaul works or repair shops for the entire bus fleet. The works extend over 31 acres of ground, of which the buildings cover more than half. In these shops the methods of quantity production and manufacture are applied to the maintenance, repairs and renewals of the buses. It is here that the motor bus is rebuilt every year. The plant will accommodate under pressure 120 vehicles weekly, and when under full swing, two thousand workmen are employed. The effect of the opening of this plant has been that the overhaul of the buses has been carried out standardized and speeded up to four times its former pace. The maintenance is so effective that a breakdown in the bus service is rare nowadays. In 1920 the loss of mileage was only three miles in 10,000, a percentage of 0.03. Approximately at the end of the year's service, the cars are taken to the shops and completely overhauled. All of its parts that can be repaired are repaired, the first class is made. When new parts are necessary they are provided. From the accumulated parts a new

bus is assembled. That is, at the end of each year, after a service of about 30,000 miles, an entirely new bus is produced, the parts being practically all interchangeable.

This was a most unusual plant. Nothing else like it was seen. In fact, it is believed there is nothing else like it in the way of a maintenance plant.

#### DIRECTION SIGNS NUMEROUS

In London and Paris a great many maps and direction signs are used on the buses to help passengers to know what route to take. The results are very good. The disposition in these cities, not only on the bus lines but on the other transportation lines as well, seems to be to furnish as much information as possible, inside and outside of the buses, for the convenience of their passengers. Both in London and in Paris, pocket bus maps, giving all of the bus routes, are easily obtained, free in London and by purchase in Paris.

In London, Paris and Berlin the transit conditions are different psychologically from those in New York. The mental attitude of passengers toward the operators of the transit lines is different. They are more amenable to suggestion and control than they are here. They expect to have information furnished in such a way that they can conveniently use it. They seek it for themselves. And from our viewpoint, the strange part about it is that they endeavor to be guided by the directions given. They are willing to do what they are told to do. The painted white lines on some of the London Underground station platforms illustrate this. These guide lines indicate the limits within which the passengers are expected to form queues, so that they may board the trains in the order of their arrival, and in an orderly manner. And they do it. We would have to mark out such spaces with 2-in. pipe railings and then have policemen on hand to compel the formation behind the railings.

Dealing with traffic problems under such conditions, where everybody plays the game and follows the rules, is very different from the situation we have to confront, where you cannot tell anybody to do anything, but where every one does as he likes—or where the conditions are such that it is necessary so to arrange matters physically that people

have to do what you want them to do.

As shown in the accompanying tables there is great variation in the development of the various means of transit in the different cities.

The bus lines route-miles refer to the miles of street traversed by the bus routes, not the summation of the trip mileages of the several bus routes.

The tramway and bus route mileages together, in New York City, aggregate 657 miles of route. In other words, there are 657 miles of

Table I—Municipal Surface Line  
Mileage—Tramways and Buses

	Tramway Lines		Bus Lines Route-Miles
	Route- Miles	Single-Track Miles	
New York.....	632	1,264	25
London.....	155	310	253
Paris.....	155	310	104
Berlin.....	110	220	15

street traversed by trolley and bus routes. On the theory that every citizen should not be more than  $\frac{1}{2}$  mile away from a rapid transit line or  $\frac{1}{4}$  mile from a surface line, New York City should have about 1,000 miles of tramway and bus routes. Its tramway and bus systems together in the aggregate, therefore, have been developed to about 65 per cent efficiency. The tramway system in New York City is an important element in the transit scheme, but the bus system at the present time plays an insignificant part.

The tramways of Municipal London, included above, are only those tramways operated by the London County Council; that is, within the County of London. This system does not serve all of London County. It pretty generally traverses the area south of the Thames and also that area in northeast London not covered by the rapid transit system. The tramway system does not route into and through the business center. This is a small area about 3 square miles north of the Thames. But it would be a doubtful policy to extend the system into this area for here the greatest vehicular congestion in the streets exists, and the tramway lines would undoubtedly intensify this congestion.

The bus system on the other hand is the only comprehensive system in London. That is, it serves the entire municipal area both north and south of the Thames. It operates into the center and out into the outermost limits of the county. It is the most convenient system of transit in London. But it parallels

and competes with the tramway system. Tramways and buses should supplement each other—not compete against each other. To do this is a community waste.

There are about 144 route-miles of tramways in extra London, and some bus lines, just how much bus route the figures do not show.

In municipal London the tramway and bus routes together amount to 408 route-miles, whereas theoretically, the area of municipal London could be conveniently served by a surface system made up of tramways and buses, consisting of only 370 route-miles. As now developed, therefore, the London system has reached about 110 per cent efficiency. In other words, from a convenience point of view, there are more surface facilities than necessary. The competition between the tramways and buses accounts for this in a measure.

In Paris, as in London, the tramways do not traverse the central business area. The extent of this area, however, is not as great as in London. It is only about  $\frac{1}{4}$  mile in area, and is about 1 mile long by about  $\frac{1}{4}$  mile wide. As the situation is understood, in Paris it is not proposed to have the tramways enter this area. On the contrary there is an inclination to remove the tramways from the more congested street areas and replace them with buses on the theory that the tramways cause more congestion than the buses do. The area outside of the Paris fortifications, as well as the area inside, is served by the tramways. Routes of the urban system to some extent extend out into the extra area, and then there is an outside system which begins at the fortification line and extends further out. This latter system is partly used as feeders for the rapid transit lines, but not for the same fare. But the buses in Paris operate almost entirely within the fortifications. The tramways and buses do not compete. The two systems are operated by the same company.

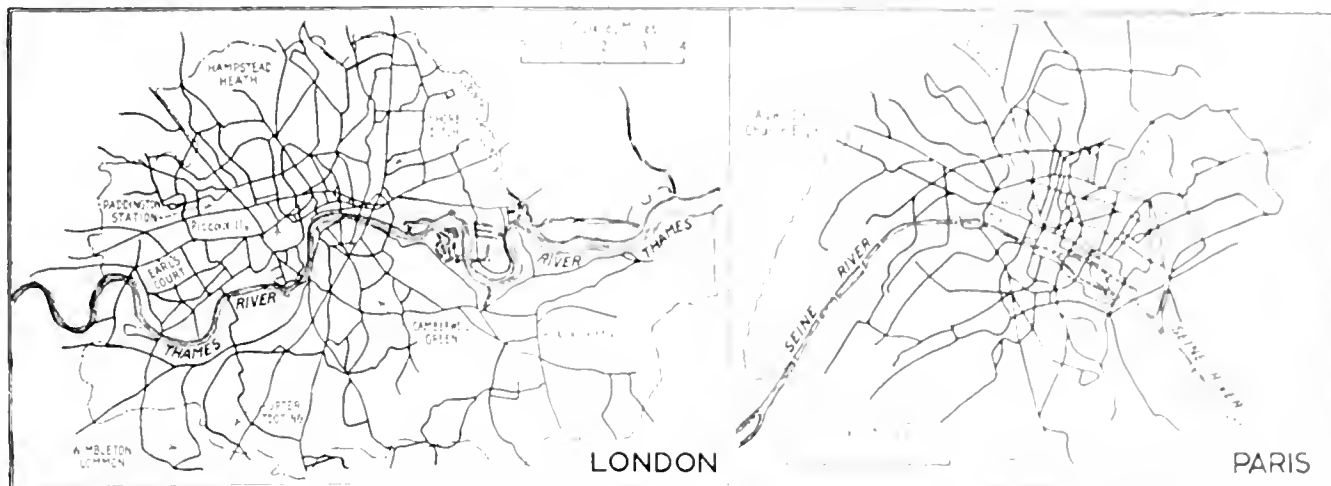
In the city of Paris the tramway and bus routes aggregate 259 miles. Theoretically, from the convenience standpoint, Paris ought to have about 100 miles of tramway and bus routes, so that the tramway and bus systems of Paris have been developed to about 259 per cent efficiency. In Paris, therefore, capacity requirements now determine the extent of the tramway and bus sys-

tems—instead of convenience—just as is the case with its rapid transit system. There is an extensive system of tramways in extra Paris, about 167 route-miles.

In Berlin the aggregate routes of buses and trams amount to 125

the capacity standpoint. More facilities are needed because of the much greater density of population in the areas being compared. In Berlin the reason for the lack of rapid transit facilities is that Berlin has depended largely upon its Ring-Bahn

are charged on the fares in London, Paris and Berlin. In London the fares vary from 14d (28 cents) for a ride of two stages of 1 mile each, or a mile in total distance, to 14d (26 cents) for a ride of twenty-seven stages or 13½ miles total dis-



miles in the municipal area. But there are about 240 miles of route in the extra area. Municipal Berlin only requires 90 miles of transit facilities, trams and buses, from the standpoint of convenience of access. It actually has 125 miles, so that the surface facilities have been developed to 137 per cent efficiency.

From the foregoing it appears generally that New York is under-supplied both with rapid transit facilities and surface facilities. London is under-supplied with rapid transit facilities, but over-supplied with surface facilities. Paris is over-supplied both with rapid transit and with surface facilities. Berlin is greatly under-supplied with rapid transit facilities, but is over-supplied with surface facilities. In talking about being over-supplied with facilities, however, we are speaking only from the convenience of access point of view. In the case of Paris, the average population density is 151 people to the acre, so that the facilities are no longer being supplied from the standpoint of convenience of access, but from

*Bus routes in London and Paris. The former carries nearly four times the passengers each year.*

and Stadt-Bahn and some other steam railroad facilities as a substitute for rapid transit facilities. The same thing may be said about London, so far as rapid transit facilities are concerned. South London and northeast London are dependent entirely upon steam railroad suburban service for rapid transit facilities.

#### FARES AND OTHER STATISTICS

As far as New York is concerned, it must not be forgotten that we have been dealing with New York as a whole. Richmond and Queens are almost entirely unprovided with facilities. If the transit conditions in Manhattan, Brooklyn and the Bronx were analyzed separately, the picture would be a very different one. But the figures are not available to permit this to be done at this time. In this connection if we consider the new Berlin, the same figures would likewise be very materially altered.

As shown in Table II zone fares

tance. In Paris the fares for first and second class are, respectively, for one stage, 40 centimes and 25 centimes; two stages, 55 centimes and 40 centimes; three stages, 70 centimes and 50 centimes. In Berlin as in London there is only one class. The fare last summer, for one stage was 5 marks; for two stages, 7 marks, and for three stages, 8 marks.

Table III gives statistics of bus traffic in the four cities mentioned.

#### Use of Mirrors Benefits Driver

THE American Automobile Association in a recent statement advocates the use of mirrors, which will show the automobile driver at a glance the condition of traffic immediately behind him. It is pointed out that the mirror, mounted at the left side of the wind-shield on the open car or screwed to the frame of the closed car in the same position, calls immediate attention to any vehicle approaching from the rear and often avoids a collision with the resultant damage and possible loss of life.

Fifteen states and the District of Columbia have adopted laws requiring the use of mirrors, and the movement is spreading to other states. It is believed to be only a matter of a few years before the majority of the states will have enacted similar legislation, covering all types of motor carriers.

Table II—Kind of Fare Charged

	Rapid Transit	Trolley	Bus
New York.....	Flat	Flat	Flat
London.....	Zone	Zone	Zone
Paris.....	Flat	Zone	Zone
Berlin.....	Zone	Flat	Zone

Table III—Statistics of Bus Traffic Last Available Years

	Number of Passengers in Millions	Percentage of Total Local Traffic
New York.....	51	2
London.....	932	43
Paris.....	246	21
Berlin.....	21	4

## Railroads Advertise Bus Service in National Park

Co-operation With Operator Results in Na-  
tion-Wide Distribution of Bus Literature—  
Railroad Booklet Tells Bus Story in Full

THE Rocky Mountain Parks Transportation Company, Estes Park, Col., distributed 100,000 of its illustrated tourist folders for the 1922 season. In 1921 the edition, though big, was much smaller—60,000 to 70,000. And only four years or so ago, folder advertising was largely an experiment, with only one railroad co-operating in distribution.

Now, railroads all over the country co-operate. The company's service is represented in summer tariffs of all railroads, and ticket agents anywhere will provide transportation through to Estes Park, or over the company's "circle trip" which takes the tourist into the Rocky Mountain Park through one gateway and out another. Bus transportation of the type supplied by the Rocky Mountain Parks Company can be expected in the future to appear numerous in collections of tourist and travel literature. For years ticket offices and hotels have had the literature of steamship lines and railroads. Now, the world is to have bus line literature. What is this literature going to be like?

The folder put out by the Rocky Mountain Parks Company this year is printed on a sheet 13 x 14 in. in red and black ink and folds to make sixteen pages. The covers are the same bright red used on the company's twelve-passenger automobiles. Note the word "automobiles." This folder does not use the word "bus." Travelers into Estes and the National Parks are there to see things, and the word "automobile" carries the right suggestion.

The little folder is a model of condensation. Here is how the sixteen pages are divided:

Two pages—map showing company tours.

Two pages, headed "Rocky Mountain National Park." Opening the folder, the reader encounters a general description of the park. At the foot is shown a group of loaded company automobiles, ready to start on their trips.

The description closes with the following, in italics: "Leave Chicago Saturday evening and be in Rocky

Mountain National Park for luncheon Monday. You will notice that our autos leave Denver at 8 a.m.; you can get aboard at the Union Station; our agent will direct you."

The feature trip of the company, the "two-day circle trip," is given three pages. Two of these pages describe the trip. The third page contains the schedule for the "circle trip" only.

Two pages are headed, "How to Reach the Rocky Mountain National Park." This gives the reader directions for obtaining tickets, and recites particulars concerning baggage, stopovers, Pullman reservations, etc. Next come the daily schedules between Denver and Estes Park, and between other points covered by regular service. These also occupy about two pages of the booklet.

### FULL DIRECTIONS GIVEN

Two pages of the folder describe the tours in Rocky Mountain National Park. These take tourists into the National Park, Estes Park (just outside the park) being the starting point. Four small maps illustrate these tours, which vary from 16 to 85 miles in length.

Information about the headquarters of the company, location of Denver office, and photographs taken in the park fill up the remaining three pages.

From all of the foregoing, it will be seen that this little folder accomplishes a great deal. It serves as a time-table; it gives information concerning fares not usually found in time-tables; it informs the reader concerning baggage and other regulations; it contains photographs of the company automobiles in attractive mountain settings; in addition, it gives nutshell descriptions of company tours.

A small folder of this character cannot do everything. Its pictures, its bits of description, may not be sufficient to rouse the reader to the point of desire, although a more elaborate booklet might. The company considered such a booklet but has not issued it.

The Colorado & Southern railroad,

however, has used a splendid booklet on the park, 32 pages and covers, with a wealth of pictures and description. In it is included full information on the Rocky Mountain Transportation Company tours. On the colored cover is a mountain road sketch, containing one of the bright red twelve-passenger automobiles of the Rocky Mountain Parks Transportation Company. This booklet is being distributed all over the country. It contains a map of the territory much larger than that in the R. M. P. T. Co.'s own folder, and on this tours of the company are shown printed in red ink.

Thus, in 1922, is bus transportation into, out of, and in, the Rocky Mountain National Park being advertised. One of the most significant features of the whole story is the co-operation between railroad and transportation company. The former understands how much more attractive automobile transportation makes the park to the traveling public.

And as the public realizes the convenience of such transportation, it can be depended on to visit the park in rapidly increasing numbers.

## Bus Developments in Spain

THE motor bus is forging to the front as a factor in Spain's transportation system, according to recent reports which indicate that the bus is gradually supplanting the horse-driven stage coaches. Inadequate railway facilities provide another reason for the development of motorized traffic. In the Malaga district alone, it is estimated that more than sixty buses are in service.

Bus companies have also recently been formed in the cities of Madrid, Barcelona and Valencia. Tillings-Stevens motor buses are used on many of these lines.

## Holiday Service in Chicago

DURING the holidays, several large Chicago department stores operated a system of free buses to carry shoppers from the public parking space in Grant Park to the stores in the Loop District. The service was installed for the benefit of women shoppers who drive their own cars. Parking space for automobiles in the downtown section was at a premium because of the stringent police restrictions in effect.



## Schuylkill County Has Bus Feeder Service

Pennsylvania Interurban Railway, Through  
Subsidiary Company, Operates Buses With  
Drive on the Front and Rear Wheels

THE Schuylkill Transportation Company, which, as announced in the August issue (page 453) of BUS TRANSPORTATION, is owned by the Schuylkill Railway, now has six twenty-nine passenger buses in operation on two lines in Schuylkill County, Pa. One runs from Mahanoy City 11 miles east to Tamaqua. The second line is 10 miles long from Lakeside Park, about half way between the terminals of the first route, to McAdoo. The operating center and the garage are at Mahanoy City. Schedules are arranged so that the bus connects with the interurban from Pottsville; the fares are separate, however, and no transfers are issued.

The equipment consist of chassis made by the Four Wheel Drive Auto Company, Clintonville, Wis., on which are mounted steel bodies built by the G. C. Kuhlman Car Company, Cleveland, Ohio. The chassis are of the 3-ton type adapted to bus service, while the bodies are the Kuhlman all-steel type, with slight alterations required by the chassis construction. Complete with all equipment, such as fare boxes and heaters, the vehicles weigh about 9,700 lb., of which 6,500 lb. is represented by the chassis. The speed is kept down to 25 m.p.h.

by a governor. Other general data are given in the accompanying table.

As shown in the photographs, the driver's position is at the right, and above the engine. It was necessary therefore to place the door back of the driver's position. This gives space for an extra seat, which faces backward opposite the service door. The entrance step is of the folding type; this is connected with the outward folding door so that both are controlled by the one lever.

### Main Dimensions of Schuylkill Buses

Wheel base	176 in.
Wheel gage, front and rear	60 in.
Turning circle, diameter	80 ft.
Loading height, floor, at passenger entrance	44 in.
Overall length of body along chassis frame	20 ft. 1 1/2 in.
Height, top of floor to ceiling	6 ft. 3 in.
Width of body at seat cushions	6 ft. 10 in.
Extreme width, at fenderboard	7 ft. 7 1/2 in.

The equipment includes dome lights mounted on each side in the space provided for advertising cards, an Ohmer fare register, roof ventilators, and a khaki curtain back of the driver. Two Perfection heaters, new type, are mounted underneath the front seats.

*Pair of F.W.D. buses, with fuel tank under frame, and interlocking door-and-step mechanism.*



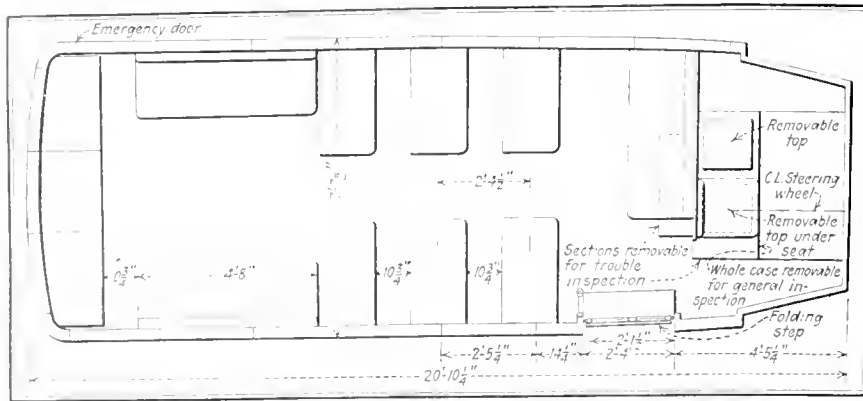
*Interior of the body of the Schuylkill bus, showing the folding entrance door and the driver's position.*

Complete electrical equipment, starting and lighting, is located back of the seven doors. Extra of the seven doors. Extra illuminated by a 21 cp. bulb. At the service door is a 2-cp. top light, and a green bull's-eye is mounted at the front end of the body, a dash with the view of the facing buses. Push buttons for a buzzer system are mounted on the side window posts.

It will be noted from the layout, as well as from the interior view, that a vertical aluminum stanchion is placed at the left of the service-door opening. This has a cross railing for the use of entering passengers. Another aluminum stanchion is placed at the rear between the longitudinal seats.

The tires used are of the Overman cushion make, 37 x 6 front and rear, mounted on special artillery felloes. The principal chassis feature, how-





*Plan view of twenty-nine-passenger Kuhlman body.  
Four passengers carried on seat back of driver*

ever, is the four-wheel-drive construction. From the engine, which has four cylinders,  $4\frac{3}{4} \times 5\frac{1}{2}$  in., power is transmitted through a multiple-disk clutch, and a three-speed transmission of the jaw-clutch type. In this construction the gears are always in mesh instead of being shifted, and speed changes are made with jaw clutches consisting of six teeth that engage at the same time. The rear end of the transmission is connected by a 5-in. silent-type chain to a differential placed under the transmission. The purpose of this

extra differential is to compensate for the different distances covered by the front and rear axles. From this differential, drive shafts lead to both front and rear axles. These are of the full-floating type with bevel-gear drive. The front axle has universal joints at each end so that the wheels can be moved for steering. Two sets of brakes are provided, both of the contracting type. The emergency is on the rear wheels, and the service (foot) brake is mounted on a cross member directly in the rear of the transmission.

## The Trend of Bus Regulation

*By E. V. Kuykendall, Director*

State of Washington, Department of Public Works, Olympia, Wash.

**In States Without Bus Regulations Moderate Statutes Patterned After Those in Force in Other States that Require Proof of Necessity and Convenience Are Likely of Enactment. Highway Maintenance Charges Will Be Cared For by Taxes on Gasoline Purchased**

**T**RANSPORTATION by motor bus is expanding in such a rapid manner and is becoming such a vital part of the transportation scheme of the country that its regulation is forcing itself upon the attention of legislatures everywhere. Substantially half the states of the Union have already provided some form of regulation for automotive transportation; and it now appears probable that, when the winter sessions of the legislatures have completed their labors, at least two-thirds of the states will have provided some measure of regulation for motor vehicle transportation.

In every community will be found a class of persons who favor such legislation as will foster and encourage motor transportation and at

the same time another class will be found who look upon it as a traffic destructive of highways and a menace to rail transportation.

In those states which require a certificate of public convenience and necessity as a prerequisite to the establishment of motor vehicle operation almost all hearings develop the fact that these two antagonistic groups exist everywhere, except of course in communities having no other established modes of transportation.

We often hear such argument as this: "We have spent large sums of money building highways and we don't want them torn up by heavy auto trucks and stages." Another individual in the same community will reason thus: "We have been

taxed to build good roads and we desire the fullest use possible from our investment. If you deny us a bus line, you will deprive us of one of the substantial benefits that should follow the construction of good roads." The two men who express these opposite views may even be neighbors engaged in the same occupation.

As the average legislator reflects the views of his constituents, it is but reasonable to assume that the legislatures now in session or about to convene will be composed partly of individuals who favor such legislation as will tend to foster and stabilize automotive transportation as well as those who will seek to curtail and restrict it. The result will be the enactment of statutes moderate in character and similar to those in a majority of the states already engaged in the regulation of this mode of traffic.

### SENTIMENT FOR A HIGHWAY TAX GROWING

There is a growing sentiment that motor transport companies should be made to contribute a substantial sum for the use of the highways. The railroads of the country are especially insistent upon legislation looking toward the accomplishment of such purpose. The damage to highways by motor vehicle operations subject to regulation has been exaggerated in some quarters. The stages and trucks engaged in a common carrier service and subject to regulation do less damage to the highways as a rule than the private trucks operated by companies in connection with their own enterprises, such as logging companies, oil companies, creameries, condensaries and fuel companies.

It should be borne in mind that all private trade operations will entirely escape a tax such as a percentage of gross operating revenue levied against common carrier trucks and stages, though their loads will average heavier and their use of the highways will average tenfold greater. In my own state (Washington) there are about 235 trucks in service by regulated companies, while about 31,941 truck licenses have been issued, so that there are nearly fourteen times as many trucks used by private individuals and companies upon the highways as there are by regulated concerns. To impose any form of tax in the nature of compensation for use of



highways upon regulated concerns alone would be unjust, and the revenue thus derived would be trifling in comparison with a tax that would reach all commercial users of the highways.

The use of the roads by oil companies, loggers, etc., which deliver their own products or raw materials is no less mercenary or commercial than that of the regulated stage or truck.

Again, the regulated common carrier stage or truck is required in most states to furnish a bond or insurance policy to indemnify the public in case of death, personal injury or damage to property caused by any act of negligence on the part of the operator. This insurance costs from \$50 to \$150 in the case of a truck and from \$100 to \$800 per annum in the case of a stage, graduated in most instances according to capacity. The individual trucker escapes this requirement of the law. To impose additional burdens upon regulated companies, which private concerns making a larger use of the highways escape, would be unfair and would tend toward evasion of regulation.

Furthermore, in my own state and in some other states, certain fees are exacted from auto transportation companies to assist in defraying the expense of regulation. Such fees are exacted from motor vehicle concerns and not from rail lines or other utilities on the theory that, having the free use of highways built and maintained by the public, such companies enjoy a certain advantage which justifies the exaction of such fees. There is perhaps nothing unfair in requiring motor vehicle companies to pay the cost of their own regulation, even if similar fees are not collected from other regulated utilities; but, if some additional tax is imposed on top of fees for regulation and the cost of compulsory insurance, from which unregulated vehicles are exempt, the result will be inequitable and illogical.

Viewed from the standpoint of fairness, and simplicity and economy of administration, the gasoline tax seems the most practicable method of requiring the users of highways to contribute in exact proportion to the use they make of the public thoroughfares. Such a tax is paid by unregulated trucks hauling heavy commodities, as well as by vehicles operated by regulated companies.

If it should be the purpose of legislatures in states which have not yet tried the experiment of bus regulation to protect the railroads from bus competition, this could be more effectually accomplished by prohibiting the establishment of bus transportation in territory already served by rail. Some states already have such provision. No act regulating bus transportation should be enacted without the certificate of convenience and necessity feature. Under such a provision, the regulatory body can exercise its judgment in excluding auto companies from fields already adequately served by railroads, and work out a policy that will co-ordinate the transportation systems of the country to the interests of the public.

Furthermore, every argument favoring the certificate of convenience and necessity, as regards the establishment of utilities generally, applies with added emphasis to the institution of motor bus and truck transportation, because of the small investment necessary to enter this field. It is the only means of guaranteeing to the public continuous, safe and efficient auto transportation. Without it, fly-by-night operators would skim off the cream of the business in the summer, when operation was cheap and pleasant, and, on the approach of winter, would abandon service, and go into some other line. There would be no incentive to investment in substantial equipment, through fear of such fair-weather, cut-throat competition.

In some states consideration is being given to the idea of placing the regulation of auto transportation in some board or officer other than the established regulatory body. To do so would be an unpardonable blunder. No other board is equipped with the engineering and accounting force or has had the training and experience necessary to the efficient regulation of this traffic. From a regulatory standpoint, the same principles apply to auto transportation that are applicable to other utilities. To lodge the regulation of this character of traffic with any other board or officer would be wasteful and illogical. It would require such other board or officer to employ experts, engineers, accountants and clerks and train them for this work, while the state regulatory body already has trained forces engaged in the same character of service already on the payroll.

## California System of Checking Drivers

THE buses used on the Santa Rosa-Petaluma-Sausalito stages have a large numeral painted on the rear, as shown in the photograph. The purpose of this is to furnish an easy means of identification so that motorists on the road can report any discourtesy.

William Curtis, the owner of the company that is operating these buses, believes in maintaining good will among all users of the highway. His driver must live up to the air-



*The number is for identification purposes, as a check against discourtesy.*

written courtesy, as well as to all the laws of the road. In case they do not, the public is invited to report the number of the car and the time of the day directly to Mr. Curtis.

The picture also shows a combination rear boot and tire rack. Two latches are provided for the door, one of the tapered refrigerator type, which clamps it shut and prevents play or rattling, while the other is simply a snap to make sure that the door does not fly open if the first latch should fail. The door is wider at the bottom than at the top so that gravity also holds the door shut.

The automatic stop signs are at the top of the boot in a retracted position so that they are clearly visible to cars approaching from the rear. It will be noticed that no locks are provided either on the boot or the tires. These are usually omitted on Western stages and buses, since experience has shown that baggage and tires are free from unauthorized molestation.

## Bus Service in Boston

Careful Records Compiled by the Boston Elevated Railway Indicate an Operating Cost of About 35 Cents a Bus-Mile—Twenty-five Passenger Buses in Service for Almost a Year

WHILE the Boston Elevated Railway has put in service only a few buses as yet, it has in contemplation several other lines where it believes that buses would be more desirable than trolley cars. These cases are either on an existing line with light traffic where the track is worn out and would have to be removed if trolley service is continued, or they are on new routes where the expected traffic is light.

The first bus line started by the Boston Elevated Railway began operation last February and runs over a route from Union Square, Allston, about 2 miles west to Watertown Arsenal. Formerly there was a single-track car line over the greater part of this route, but about a year ago the city decided to repave a considerable portion of the street on which this track was laid. This meant that the company would have to put in new tracks if it wished to retain its car service, and even to extend the line if it desired to give through service into Watertown. At that time the line carried about a thousand passengers per day. The matter was taken up with the residents along the route, and it was found that a bus service would be just as satisfactory to them, so the tracks were taken up and the bus service was substituted.

### ELECTRICS' HEADWAY USED

Four buses are used on this service, two for regular service, one for spare and one extra during the rush hours. The headway is the same as formerly with the electric cars, namely, every seven or eight minutes during the morning and evening peaks over a portion of the route and every fifteen minutes at other hours during the day.

Another route was established the first of the year in Walden, where buses take the place of trolley cars for part of the route. Here also the company was faced with the alternative of laying new track or putting on bus service and concluded that the traffic on the line was not enough to justify the cost of new track. This line will run a bus every ten minutes. Three buses will be required with one spare. Two or three other bus

lines are being considered, including several crosstown and feeder routes in new territory.

Since buses have been operated by the Boston Elevated Railway, careful statistics have been kept of their daily performance. One policy followed has been to keep the cost of operation as far as possible distinct from that of the electric railway system. For this reason the buses are not stored in a carhouse of the company but in a commercial garage, which makes a storage charge of \$30 a month per bus. For the services at the garage for inspecting, oiling and cleaning, the company pays in addition a dollar a day. Oil and gasoline are charged in the operating expense account at the market rate, which in Boston during November and December was 26 cents per gallon, with engine oil at 30 cents a quart.

### ONE-MAN CAR WAGES PAID

The operator is paid the same wages as the motormen on the surface cars, namely, the base rate of 63 cents an hour, but with the usual 8-cent bonus for a one-man car, making a total of 71 cents an hour. To this, in the accounts, must be added the cost of an "extra" or "cover" man on the list, so that actually the labor cost for the bus is carried on the books of the company at 83 cents per hour.

Depreciation on the bus is figured on an assumed life of four years, based on the actual list price of the bus, less the cost of the tires. The depreciation on tires, arbitrarily assumed, is 1½ cents per mile, adjusted from time to time, so far as is possible, within the life of the tires. Other overheads included in the bus accounts are as follows:

*Supervision.* This is assumed to be the same as the average per car of all the surface cars of the company in 1921, or \$0.02386 per car-mile.

*General and Miscellaneous.* This includes the salaries and expenses of the general officers and clerks, general office supplies and expenses, law expenses, relief department expenses, pensions and gratuities, miscellaneous general expenses, injuries and damages, insurance, stationery

and printing, and is charged per bus-mile at the average cost of the surface line cars in 1921, or \$0.03469 per car-mile.

The daily records are kept on a form carrying the following heads:

- Date
- Day of week
- Total miles operated
- Total hours in service
- Total revenue collected (cash)
- Passengers carried
- Gasoline burned (gallons)
- Engine oil burned (quarts)
- Miles per gallon of gasoline
- Miles per quart of engine oil
- Maintenance of equipment
  - Inspecting, oiling and cleaning
  - Repair labor
  - Material
  - Reserve for repairs
  - Depreciation on bus
  - Depreciation on tires
- Fuel
  - Gasoline
  - Engine oil
- Conducting transportation
  - Operators
  - Supervision
- General and miscellaneous
  - Garage and state registration
  - Total operating costs (a summation of the previous operating costs)
  - Interest and taxes
  - Total cost
    - Average per mile
      - Passengers carried
      - Cash and revenue collected
    - Total cost
  - Actual cost of tires to date
  - Trouble, repairs, replacements and service
  - Number of trips missed

*Taxes* are 2 per cent per annum on the list price of the bus.

*Interest* is figured at 6 per cent per annum on half the list price of the bus, throughout its depreciated life.

These figures show that the buses now in use on the Allston line vary in gasoline consumption from 4.5 to 8 miles to the gallon, according to the season of the year and the type of bus. Their average speed, including stops and layovers, is about 10 m.p.h., and the average cost of operation is about 35 cents per mile up to this time, though they have been in operation so short a time that it is almost impossible to tell what the ultimate repair cost will be.

The receipts are about 18 cents per mile, but the line is a heavy transfer line. The fares charged are the same as on the surface cars, namely, 10 cents when transfers are given to and from the connecting surface car lines; otherwise the fare on the bus alone is 5 cents. The buses have seats for twenty-five passengers and their average run is 120 miles a day or 840 miles a week per bus.

The equipment of the Allston bus line consists of one Mack, two White and two Republic-Knight buses.

Interests of the people of Oregon are best served, the Public Service Commission believes, by classifying "for-hire" vehicles the same as stages and granting no exclusive rights to a specified route

## State of Oregon in Its First Year of Regulating Motor Stage Operation

THE Public Service Commission of Oregon was plunged into the business of regulating motor carriers without much warning when a bill passed the Legislature and was signed by the Governor on Dec. 27, 1921, whereby all motor vehicles operating as common carriers would be subject to commission regulation on and after Jan. 1, 1922. Several months later two of the three commissioners were recalled and replaced by two new commissioners, whence it is apparent that internal affairs of the commission have required considerable at-

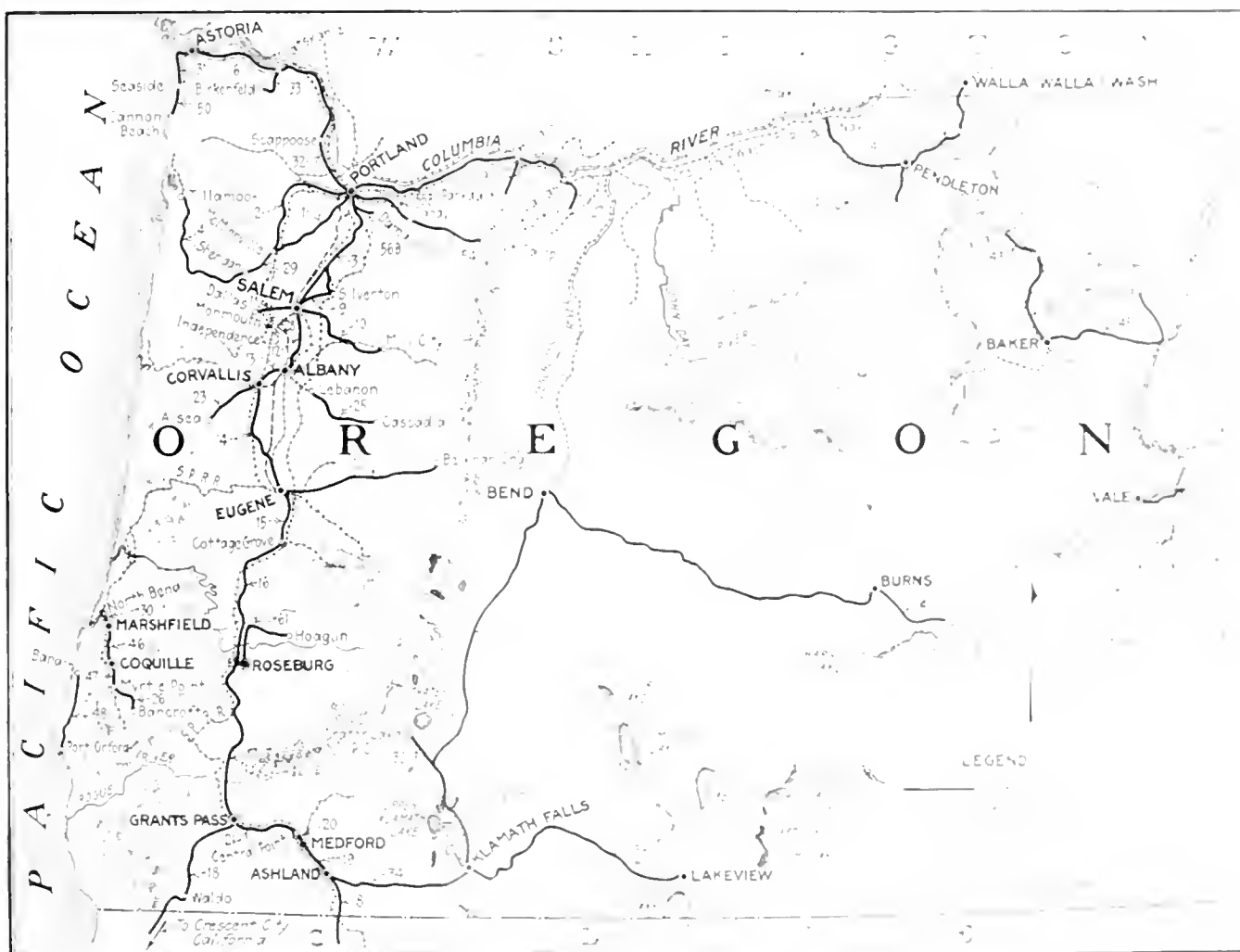
tention. However, not only has the regulatory act affecting motor carriers been put into effect and thoroughly tried out, but a very definite policy on the regulation of stage and bus operation has been worked out to suit conditions obtaining in Oregon.

Two factors that have an important bearing on motor carrier regulation in that state are the low average density of population and

the relatively different character of territory east and west of the Cascade Mountains. The topography of the state is the important factor in its distribution of population, and the difference in climate and conditions is very similar to that of Washington, described in BUS TRANSPORTATION for November, 1922. The population density of Oregon, however, has considerably less than that of the number of people per square mile compared to the State of Washington.

With an area of 95,697 square miles, Oregon has a total population of 783,389, or 8.2 per square mile.

*Numerous ranges scatter Oregon  
has lines. Most of them are  
west of the Cascade Mountains.*



If the population of Portland, which the 1920 census gives as 258,288, be deducted, the density for the remainder of the state becomes 5.4 per square mile. There are in the state eleven cities of more than 5,000 population and three of more than 10,000 population.

The Cascade Mountains divide the state by a north and south height of land attaining elevations up to 10,000 ft. The westerly slopes are heavily timbered, the valleys are fertile, the rainfall is heavy, so that irrigation is not generally required and areas suitable for agricultural development are comparatively close to their natural markets. In this western section of the state the highways have been remarkably well developed and a comparatively large percentage of the mileage has been hard surfaced.

On the east side of the mountains, however, where the rainfall is light and the climate generally colder, the roads are chiefly unpaved with the exception of the one main route of the Columbia River valley. Moreover, because of the sparsely settled condition of eastern Oregon and the correspondingly low tax revenue, the prospect for immediate road development is not good.

Before this season's road work was done a statement from the Oregon State Highway Commission gave the mileage of highways in Oregon as follows:

Paved .....	825 miles
Surfaced .....	6,000 miles
Improved earth .....	16,000 miles
Unimproved earth .....	19,000 miles

In the sparsely settled areas of eastern Oregon much of the stage business is the outgrowth of mail contracts. These contracts are usually made for a period of one year, and because of the fact that widespread advantage of the parcel post system is taken, the routes are usually covered by trucks which handle a considerably larger amount of ingoing supplies and outgoing produce than they do passengers.

This is particularly true in sections not reached by railroads or in sections where the railroad route is indirect, and hence freight rates are proportionally higher than parcel post; the former being based on mileage and the latter being based on "zone" distances which are measured in an air line. Most of the supplies, groceries, etc., that are sent into this region are packed in

### Motor Stage Routes on Record with the Oregon Public Service Commission Oct. 1, 1922

Map Key Number	Route	One-Way Distance	Number of Vehicles	Rate per Mile (Cents)	One-way Fare	Minimum Fare	Running Time, Minutes	Headway	Remarks
1	Portland-McMinnville via Newberg .....	24	6	6.25	\$1.50	\$0.25	116		9 round trips daily
2	Portland-McMinnville via Hillsboro .....	49	14	3.05	1.50	.25	100	1 hr.	.....
3	Portland-Salem .....	53	12	2.82	1.50	.25	135	1 hr.	.....
4	Portland-Tillamook .....	109	6	4.68	5.10	.50	315		3 round trips daily
	Portland-Dunthorpe .....	7	1	2.85	.20	.20	30	Irr.	Daily 8 a.m. to 6:30 p.m.
6	Portland-Seaside .....	128	22	2.55	3.25	.30	420		8 round trips daily
7	Portland-Hood River .....	68	7	3.50	2.40	.25	200		6 round trips daily
8	Portland-California State Line .....	394	8	2.46	9.70	6.00	2 1/2 days		1 trip daily
9	Salem-Silverton .....	15	4	5.00	.75	.65	35	4 hr.	.....
10	Salem-Mill City .....	38	4	4.60	1.75	.25	145		6 round trips daily
11	Salem-Dallas .....	15	1	3.34	.50	.25	50	4 hr.	.....
12	Salem-Albany .....	18	3	4.16	.75	.25	72	2 hr.	.....
13	Albany-Corvallis .....	11	3	3.18	.35	.35	30	2 hr.	.....
14	Eugene-Corvallis .....	41	4	3.05	1.25	.25	100	2 hr.	.....
15	Eugene-Cottage Grove .....	22	1	3.41	.75	.30	60		4 round trips daily
16	Eugene-Roseburg .....	74	4	3.65	2.70	.25	210		2 round trips daily
17	Grants Pass-Roseburg .....	78	4	3.85	3.00	.50	210		4 round trips daily
18	Grants Pass-Waldfo .....	40	3	10.00	4.00	1.00	160		1 round trip daily
19	Medford-Ashland .....	13	4	3.46	.45	.15	45	1 1/2 hr.	.....
20	Medford-Central Point .....	5	4	5.00	.25	.10	15	1 1/2 hr.	.....
21	Medford-Grants Pass .....	36	4	3.20	1.15	.25	75	1 1/2 hr.	.....
22	Eugene-Belknap .....	60	2	8.32	5.00	.50	300		1 round trip daily
23	Alsea-Corvallis .....	28	1	7.15	2.00	.25	120		Twice daily
24	Toledo-Siletz .....	10	1	10.00	1.00	.25	80		1 round trip daily
25	Lebanon-Cascadia .....	28	1	8.92	2.50	.50	120		1 round trip daily
26	Myrtle Point-Bancroft .....	15	1	8.35	1.25	.50	90		1 round trip daily
27	Dallas-Dufur .....	16	1	9.38	1.50	1.50	60		1 round trip daily
28	Moumouth-Independence .....	3	2	6.68	.20	.20	10		6 round trips daily
29	Sheridan-McMinnville .....	16	2	4.68	.75	.25	35		3 round trips daily
30	North Bend-Marshfield .....	3	10	3.33	.10	.05	15		.....
31	Astoria-Seaside .....	20	3	3.00	.60	.25	60		12 round trips daily
32	Seapoose-Portland .....	21	1	2.93	.60	.25	60	1 hr.	9 round trips daily
33	Birkenfeld-Clatskanie .....	16	1	9.37	1.50	1.50	105		1 round trip daily except Sunday
34	Medford-Klamath Falls .....	80	4	8.12	6.50	1.00	360		1 trip daily April to November
35	Klamath Falls-Pelican City .....	10	3	2.50	.25	.25	30		3 round trips daily
36	Klamath Falls-Chiloquin .....	29	1	6.39	2.00	.50	100		Twice daily
37	Klamath Falls-Crater Lake .....	73	6	12.30	9.00	9.00	240		Daily in summer season
38	Klamath Falls-Lakeview .....	101	2	13.83	14.00	1.25	600		1 round trip daily in summer season
39	Pilot Rock-Pendleton .....	15	1	6.68	1.00	.50	45		1 round trip daily
40	Pendleton-Wash. State Line .....	46	5	3.81	1.75	.50	110		4 round trips daily
41	Umatilla-Pendleton .....	41	1	4.27	1.75	.25	135		3 round trips daily
42	Weston-Pendleton .....	23	1	4.34	1.00	.25	75	Irr.	1 round trip daily
43	Union-La Grande .....	17	1	5.88	1.00	.50	45		2 round trips daily
44	Crane-Burns .....	30	2	8.34	2.50	1.50	90		1 round trip daily
45	Baker-Cornucopia .....	75	1	10.62	8.00	.25	510		1 round trip daily
46	Coquille-Marshfield .....	19	3	9.94	.75	.15	50		1 round trip daily
47	Coquille-Myrtle Point .....	9	3	6.11	.55	.15	35		4 round trips daily
48	Bandon-Port Orford .....	32	2	7.81	2.50	.35	160		1 round trip daily
49	Tillamook-Manhattan .....	15	1	6.68	1.00	.25	75		1 round trip daily
50	Cannon Beach-Seaside .....	8	1	12.50	1.00	1.00	30		2 round trips in summer; 1 in winter
51	Bend-Burns .....	147	2	8.00	11.75	.30	600		1 round trip daily
52	Bend-Klamath Falls .....	153	9	9.82	15.00	2.00	615		3 round trips weekly
53	Vale-Ontario .....	16	1	9.38	1.50	1.50	60		1 round trip daily
54	Portland-Gov't. Camp .....	58	2	7.32	4.25	.25	210		2 round trips daily
55	Portland-Sandy .....	25	2	4.00	1.00	.15	75		2 round trips daily
56	Portland-Damascus .....	15	1	3.67	.55	.20	70		3 round trips daily
57	Portland-Silverton .....	50	3	3.50	1.75	.25	140		3 round trips daily
58	Hood River-The Dalles .....	23	1	3.70	.85	.25	75		2 round trips daily
59	Hood River-Parkdale .....	20	1	5.00	1.00	.45	75		2 round trips daily
60	Baker-La Grande .....	52	1	5.78	3.00	.50	145		2 round trips daily
61	Hoaglin-Roseburg .....	25	1	7.00	1.75	.50	180		1 round trip daily
	Independence-Orville .....	3	1	11.67	.35	.35	20		6 round trips daily

50-lb. packages so as to come under the parcel post requirements.

Despite the fact that there is little immediate prospect for extensive road improvement, considerable increases in the motor carrier business may be expected because of the comparative economy in time and cost of this method of transportation. Rail routes to many points in eastern Oregon are indirect, requiring layovers at junctions, while the

motor route is direct and requires much less time.

Passenger accommodations, however, are not up to the standards adopted in the western part of the state. Often passengers are content simply to find comfortable places on mail or parcel post bags loaded into the body of trucks which have canvas covers. Having become accustomed to accommodations of this sort there is no general protest or

demand for more comfortable equipment.

Features of the regulatory law in Oregon are (1) the regulation of all "for-hire" carriers, the same as those operating on schedules over fixed routes, and (2) the granting of permits regardless of duplicated service.

The inclusion of the "for-hire" class of vehicles was made because Oregon has a large number of carriers that give this "on call" service, and it is believed that the operator of such vehicles is likely to need regulation even more than the carrier well established on a scheduled route who has standardized equipment and operates regularly. Moreover, the public can be more readily deceived, overcharged, or subjected to injury risks by carriers that offer "for-hire" service. Hence the act was made to include all classes of carriers that handle passengers. If an automobile owner undertakes to haul passengers for hire for only a few weeks each season he must fulfill insurance, bonds, permits, and all other requirements for the period of time during which he continues such "for-hire" service.

The policy in the matter of duplicating service is based on the theory of giving every man an equal chance and expecting the best service to endure; in other words, giving the public the opportunity to profit by competitive operation. On this point there is a difference of opinion in Oregon and many of the stage operators, particularly those owning the more important holdings, want their permits protected. Their argument is that under the present plan the operator with the most money for equipment is likely to get the business, although the trade may have been developed at some expense by an operator with adequate but not quite such luxurious cars. The influence of the operators will doubtless be felt at the next session of the Legislature, and it is possible that this feature of the act may be changed.

Passenger carriers under the Oregon law are classified in three divisions as follows: Class 1, which is known as "bus or stage line service," includes all passenger cars operating for compensation between fixed termini whether on schedule or not. A good faith bond of \$1,000 must be deposited by operators of this class for the faithful carrying out of per-

mits granted. If the operator has a U. S. mail contract, the amount of the bond is reduced to \$250. Class 2 includes "anywhere for-hire passenger service" but excepts operations confined exclusively within city limits or within a radius of 5 miles from such limits. The good faith bond for this class is \$250. Class 3, rated as "local taxicab or for-hire service," includes operation mainly within municipal limits with occasional trips to points outside but within a radius of 5 miles therefrom. For this class of service a good faith bond of only \$100 is required. All three classes are required to carry liability or property damage insurance, or an indemnity bond in lieu thereof.

The requirement is for a "good and sufficient bond." The amount in each case is determined by the commission in accordance with local conditions as to amount and kind of traffic and what protection the public is entitled to from such a carrier.

Bonds and insurance carried by competitive lines, it appears, are not taken into account. This becomes a matter of the commission's opinion as to what requirements shall govern in each case. Thus far there has been very little dispute over the point. In order to effect the commission to formulate opinion on the point accurately the application is required to submit with it supporting all data that will help the commission in properly evaluating and analyzing the situation in this regard.

The express business in Oregon, that is, as an adjunct to the limited type passenger stages which are operated in western Oregon, has not yet developed to any considerable degree. Most companies limit express packages, as well as baggage, to 100 lb. per piece.

Union stage depots are now in operation at Portland, Salem, Eugene, Corvallis, Medford, Roseburg, Grants Pass, and Ashland.

## Oregon Line Operated by Owner-Drivers



*One of twelve vehicles, of three-compartment type, operating between Portland and Albany, Oregon*

THE Portland - Salem - Albany stage line is run under a system of limited co-partnership, the corporation consisting of a number of individuals, each of whom owns and drives his own bus. The line now has twelve buses, of the White, Pierce-Arrow, and Locomobile makes. On the average each bus covers 200 miles per day. At present fourteen trips are made on weekdays and fifteen on Sundays.

The buses carry a blanket policy of liability and property damage insurance. The amount is \$15,000 on the eighteen-passenger buses, and

\$20,000 on the larger vehicles. In addition each bus carries a \$1,000 good faith bond to guarantee performance of schedule. They are subjected to fines if they do not carry out their schedules promptly.

Time table service is provided, in accordance with a schedule filed with the Public Service Commission of Oregon. Reserve buses are kept at each end of the line for emergency.

Each bus is inspected monthly by the State Public Service Commission. At this time the wiring, wheels, springs, brakes, inside and outside lights, are examined.

# BUS TRANSPORTATION

Published by McGraw-Hill Company, Inc.

CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, January, 1923

## Who's Who at the Wheel

**T**HIS is an anniversary issue of BUS TRANSPORTATION. One year ago this month the paper was born, so that the present number signalizes the first birthday of a young but sturdy and rapidly growing infant.

It should be of interest to our readers to know the men now occupying positions at the editorial "wheel." The staff consists of:

*New York:* Carl W. Stocks, editor; R. E. Plimpton, Harry L. Brown and Henry H. Norris, associate editors; George J. MacMurray, assistant editor; Henry W. Blake and Harold V. Bozell, consulting editors, and A. H. Merrill, editorial assistant.

*Chicago:* Donald F. Hine, associate Western editor.

*San Francisco:* N. A. Bowers, Pacific Coast editor.

*Washington:* Paul Wooton, Washington representative.

*London, England:* Alexander McCallum, British news representative.

These men are at your service in their respective localities. Do not hesitate to call upon them or write them or inform them of anything that will be helpful or interesting to the industry. Their purpose is to make BUS TRANSPORTATION the clearing house of the industry, and to carry out the objects of the paper as expressed by the statement at the head of the column.

— [ EDITORIAL ] —

## Year-Round Service from the Bus

**F**OR years the argument was advanced by opponents of automotive transportation that bus service was inferior to steam and electric railway service during the winter season because of the inability of the bus to cope with snow-filled highways.

A recent decision of the Colorado Public Utilities Commission completely refutes this time-worn argument. The commission granted W. E. Carver authority to establish a bus line over the protest of the Denver & Salt Lake Railroad, which contended that buses were not able to surmount the obstacle of snow blockades.

The commission found that railroad service had been uncertain in the past for the same reason, and its position is upheld, it would seem, by a court case that came up at about the same time. In this case a Colorado railroad appealed for permission to abandon its steam service during the blizzard season of the winter.

There are snowstorms so severe that buses have been forced to suspend operation, it is true, but with the coming of improved highways all over the country the bus is able to give service that will compare favorably with any afforded by other transportation agencies. This does not hold true of any particular section or class of service, either. Last winter, when the city of Washington experienced its worst snowstorm in twenty years, motor buses furnished about the only means of local transportation, operating when the steam and electric lines were wholly paralyzed.

Thus the ancient stock argument has been dispelled by the actual "year-round" performance of the motor bus.

— [ EDITORIAL ] —

## Review and Forecast

**A**FTER one year of publishing existence BUS TRANSPORTATION takes this opportunity to stand back and look around, so to speak. This Annual Review and Forecast Number represents an earnest attempt to describe the important things done in the bus industry during the past year, to appraise their effect on the future, and at the same time to venture certain predictions as to what is ahead of bus operators and others in the industry. All this in addition to the regular "balanced ration" of news and articles served up in every issue.

Enthusiasm, high hopes, almost unbounded optimism characterize the review articles. Nineteen-twenty-three, it is predicted, will break all records in its bus activity. Improved equipment at lower prices is looked for as a result of production in larger quantities.

The bus has practically developed a new branch of automotive manufacturing, according to Cornelius T. Myers, who emphasizes the value of knowledge of design, manufacture and repair in the selection of rolling stock and other equipment. Trolley buses have doubled their number during the past year, and J. C. Thirlwall believes that the number will be materially increased this year.

Comfort for those who fear the legislative bogey is given by the Director of Public Works, State of Washington, who thinks that new bus legislation to be passed in 1923 will be of a moderate character, similar to that already in force in states which have adopted regulatory measures.

There is space here to mention only a few of the review articles which appear in this issue, but all of them deserve careful study. In many of these articles will be found running the thought that bus men want better transportation knowledge, and that as this knowledge is secured and put to work the problems that appear so serious today will gradually fade away. Operators can then devote their attention to giving adequate service with equipment

sued to the needs of their part-time traveling public.

The volume of the 1923 bus business will depend, of course, to a certain extent on the general business conditions throughout the country. It is agreed that these are favorable, so that there is every reason for bus operators to plan for the future along sound lines.

In 1923, as during the past year, BUS TRANSPORTATION will work to develop the bus industry for the best good of the public. Its efforts will be centered particularly on matters connected with the business of transportation. At the same time, subjects relating to their vehicles, garage facilities, terminal and waiting room equipment, will also receive attention, in so far as they interest bus operators. With this program in view, BUS TRANSPORTATION extends to all its readers the greetings of the New Year, and promises the utmost co-operation in the solution of their working problems.

[ EDITORIAL ]

### *Mixing Buying with Brains*

**T**HE income of bus operators is usually a fairly fixed quantity. To make, and to continue to make, a fair profit means therefore that the figures on the other side of the ledger must be watched with never-ceasing vigilance. In buying equipment particularly the progressive operator will take advantage of every opportunity for saving.

Effective buying depends to a large extent upon the accurate knowledge of operating results. This is available, with the growth and better organization of bus systems, through accurate records of performance. Many operators have reached the point where the performance of vehicles, parts and accessories can be definitely measured and the real or effective value of one make compared with that of another.

Hit-or-miss methods of buying are still too common, however. Purchases are scattered when concentration on a single source or dealer would effect economies. Equipment poorly adapted to the work required is bought for the lack of broad knowledge of the possibilities. Improved devices possessing definite cost-cutting value are ignored because of the sort of inertia which is content with things as they are and refuses to experiment with new and better equipment available.

This is not true of all operators, of course. Many of them are buying in quantities, by long-term contract, by specification of reputable products, or by concentrating on supplies or equipment for which the performance, in terms of life or cost per mile, can be guaranteed. Buying becomes more scientific also when experience of experts outside the bus organization is applied to the selection of equipment best adapted to the operating conditions.

Buying must be mixed with brains, and this holds good equally for the large items of rolling stock and for the supplies and parts that require frequent replacement and renewal. Scientific purchasing is essential when every penny must be "microscoped" before it is spent.

# Letters to the Editor



## Taxes and Franchises

To the Editor,

W. V. Hill in his letter captioned "The Tax Law in California," that appears in BUS TRANSPORTATION for November, says among other things: "There is one point, however, that might interest Mr. Travis, and that is, that the franchises of electric railways are considered as 'operative property' by the state and are taxed as such."

From this premise Mr. Hill draws comparative taxation conclusions between the franchises of the rail carriers and those of the motor carriers which Mr. Hill insists "Mr. Travis should add" to his "operative property" in drawing a comparison between the two classes of utilities for taxation purposes."

We must confess Mr. Hill's point seems both obscure and one of those bridges it is unnecessary to cross until we come to it.

California taxation problems do not admit of intelligent discussion in limited space, but the motor carriers, as taxed in California today, own no defined "operative property" of any kind. Recognized as a public utility and taxed for state purposes, they would then own "operative property" and such a comparison might be made.

Its value would even then be doubtful for two reasons.

1. Because the motor carriers own no franchises exclusive or otherwise. The motor carriers operate under legal authority obtained from the Railroad Commission. Their "certificates to operate," however, are neither exclusive nor franchises in the sense in which Mr. Hill uses the noun.

2. While the law is as Mr. Hill states it, the value of the rail carriers is a lumped value of all they own and the tax upon them a percentage of their gross receipts of a distant, almost negligible, relationship to the value of their "operative property."

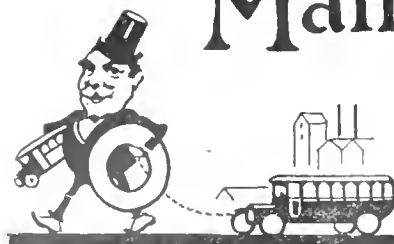
The controller's statement for 1921 shows the total value of railroad (including electric railways) "as assessed by the State Board of Equalization" to have been \$243,112,000.

The secretary of the board wrote on Sept. 27 last, in explanation of this assessment:

"The figures shown for railroads as assessed by the board in statement No. 16 (the controller's statement) does not cover anything except the railroads operating in more than one county, and the road itself and the rolling stock of these companies."

Other railroads are carried on the operations of county assessors. But, as Mr. Lack states: "There are no other taxes attached to these operative values, as the gross receipts tax paid to the state is a part of all other." MOTOR CARRIERS' ASSOCIATION.





# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

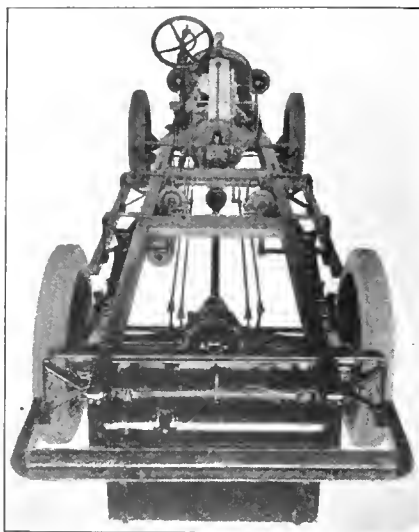
## Air System Used for Brake Application

THE Westinghouse Air Brake Company, Wilmerding, Pa., has developed a system whereby the brakes of buses and other motor vehicles are set by the force of compressed air. The equipment complete weighs from 50 to 125 lb., the amount depending upon the type and size of vehicle and the apparatus used. The usual foot and hand brakes are retained, so that they can be applied at any time, in addition to the air brakes. Advantages claimed for air brakes are quicker stops with less muscular effort, ease and flexibility of operation, and absolute equalization of the brakes.

The air-brake equipment is worked in the following manner: What is referred to as "compressed air" is piped from the top of the engine cylinder to a reservoir attached underneath the bus body. The air used is really a mixture of gasoline vapor and air, in a partly fired condition. It is said, however, that there is no danger of explosion since the mixture is cooled before it reaches the reservoir. From the storage reservoir it passes through a control valve, which may be operated either through the ordinary brake pedal, or by a handle under the steering wheel. This control valve permits passage of the air back to the brake chambers, which convert the mechanical energy of the "compressed air" into mechanical force to apply the brakes.

The connection from the brake chambers to the rear-wheel brakes is made in such a way that the existing hand or foot brakes can be used at any time. First the air-brake push rods are adjusted so that they will operate through their full working stroke, and then the hand or foot brake rods are arranged to correspond. The circuit is broken, so to speak, between the manual and air systems, by a link or replacement cable. This is inserted between the point of application of the air-brake

chambers (shown in the illustration attached to the cross member of the chassis frame) and the hand-brake lever or the foot-brake pedal. Thus the application of the brakes by the



*Bus chassis with air brakes. Control valve attached to steering post, and brake chambers to frame channels.*

air does not cause movement of either the pedal or lever of the manual system.

The more important parts of the system are the accumulator, control

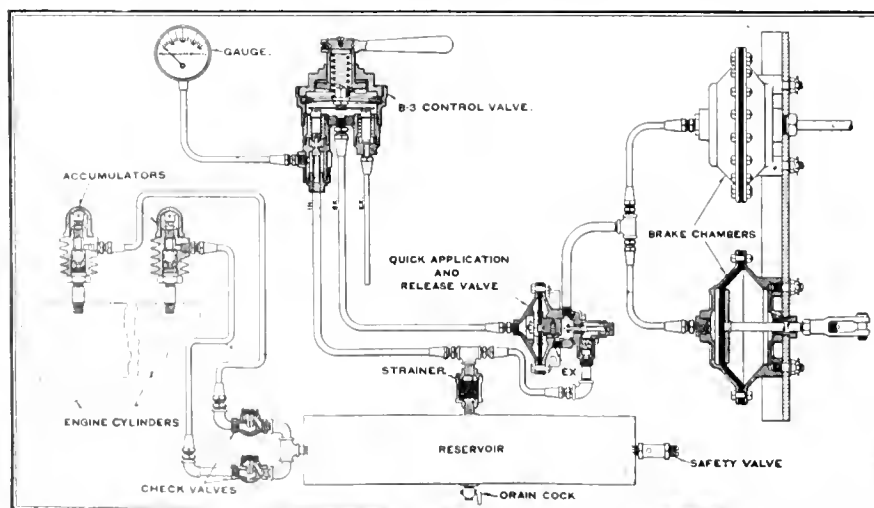
valve, quick application and release valve, and the brake chambers. One or two accumulators are used, depending upon the size of the vehicle. They are screwed into the engine cylinders, in place of existing petcocks. On the power stroke when the pressure in the engine cylinder rises, the gaseous mixture is discharged through the accumulator to the reservoir, but the ball-check valve prevents any back flow from the reservoir to the engine. If the pressure drops because of the application of the brakes, then the reservoir is immediately filled up again until its pressure balances the explosive pressure in the engine cylinder.

As an additional safeguard against loss of pressure in the reservoir, a non-return check valve is placed in the pipe leading to the accumulator. The reservoir, which is made of sheet steel, is tested at 300-lb. pressure. It is enameled inside and out to prevent corrosion and oxidation.

If required, a safety valve may be placed on the reservoir.

The control valve really serves two purposes, the application and release of the brakes, and to control, or reduce if need be, the pressure which can be applied to the brake rods. The pressure in the reservoir may in some cases rise to 200 lb. when an engine is working hard, but at no time can the pressure in the brake chambers exceed 40 to 60 lb., regardless of the reservoir pressure.

The control valve shown in the illustration is operated by turning the handle. To this valve are connected three pipes; one is the intake or supply pipe from the air reservoir, the second leads to the brake chambers, and the third is an ex-



*Arrangement of Westinghouse air-brake equipment for motor vehicles. From left to right, intake, brake and exhaust pipes lead down from control valve*



haust to the air. By turning the handle of the control valve, air can be led at reduced pressure to the air chamber, or when it is desired to release the brakes, directly to the atmosphere. The control is arranged so that a finely graduated braking pressure can be applied, although at high speed a heavy initial application is recommended, this to be graduated off as the speed is reduced, so that at the end of the stop but little pressure remains in the brake chambers.

The brake chambers consist of two dished plates, between which is a diaphragm made of two layers of live oilproof rubber, molded with an inserted layer of fabric. One side of the diaphragm is connected to the brake pipe; on the other side is a

air is admitted to the brake pipe by the control valve, however, the diaphragm is deflected inward; the exhaust valve is then closed, the inlet valve opened, and air flows from the reservoir directly to the brake chambers. Thus in case of an emergency, the high-pressure air in the reservoir is applied in the brake chambers, without passing through the pressure-reducing in the control valve.

### Light-Duty Rear Axle

THE Flint Motor Axle Company, Flint, Mich., has brought out a new axle designed for bus requirements, where maximum load and speed are essential without overheating the engine. As shown in the illustration, the axle is built up of a

on the pinion, to insure proper tooth contact and quiet gears.

Both main shafts of the axle are of heat-treated alloy steel,  $1\frac{1}{2}$  in. in diameter. Both are of the same length with a six-spline fitting on each end, so that they are interchangeable.

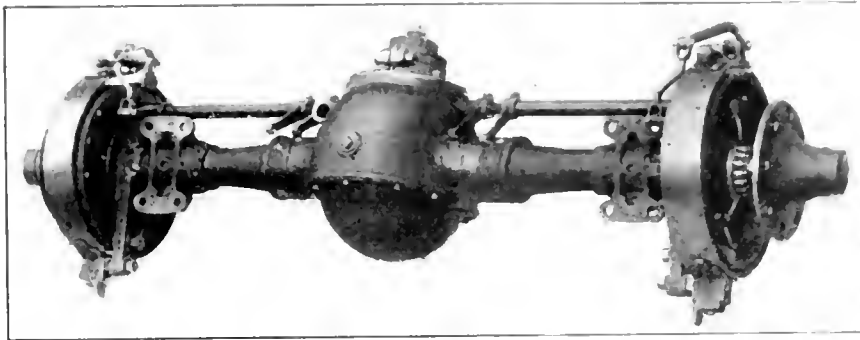
Two sets of brakes are mounted on the rear wheels, on a drum 14 in. in diameter and 2, in. wide. Both the emergency brake (internal) and the service brake (external) are fitted with Thermoid brake lining 24 in. wide. The service brake has three adjustments to insure wrapping with the least amount of power.

### Single-Plate Clutch for Heavy-Duty Work

THE accompanying illustration shows the type F.I.X. clutch developed by the Borg & Beck Company, Chicago, Ill., for heavy duty bus service. This clutch is of the dry-plate construction, pressure being applied by a coiled alloy steel spring, which forces three levers against the inclined surface of the pressure plate.

The friction or driven plate is mounted on the clutch shaft by a splined fitting. This has ten splines  $2\frac{1}{2}$  in. long and the clutch shaft is  $1\frac{1}{2}$  in. in diameter. Both shaft and disk splines are lubricated by holes drilled through the splines to the shaft center hole.

Of the two radial thrust bearings shown in the illustration, the one on



*Flint spiral-bevel rear axle, of full floating construction*

plate with a push rod connected to the brake rocker shaft or rigging. These chambers are supplied in 3, 4 and  $5\frac{1}{2}$ -in. sizes. One 4-in. or two 3-in. chambers are sufficient for light vehicles and for front-wheel application. Two 4-in. or one  $5\frac{1}{2}$ -in. are adequate for heavy passenger cars or light trucks, while two  $5\frac{1}{2}$ -in. chambers, it is said, provide adequate braking for the heaviest trucks.

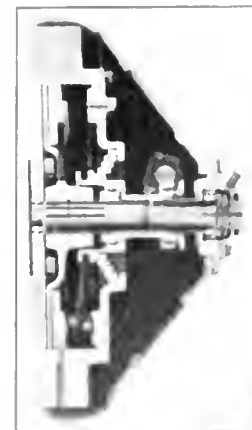
On buses and other heavy motor vehicles, an extra valve, called a quick application and release valve, is used. The control valve then serves as a pilot valve to actuate the release valve. The release valve comprises an oilproof rubber diaphragm having an exhaust valve attached to it. The chamber on one side of the diaphragm is connected to the brake pipe while the other, which contains the exhaust-valve chamber, is connected to the brake chambers. Also there is an inlet valve connecting with the reservoir and the intake pipe. Normally this diaphragm is in such a position that the exhaust port is open a slight amount so that the brake chambers are open through the exhaust valve to the atmosphere. If

one-piece malleable-iron gear case, with 3-in. tubes pressed into each side. The wheel gage is 56 in., and  $2\frac{1}{2}$  or  $2\frac{1}{2}$ -in. springs can be mounted on centers from 36 in. to 39 $\frac{1}{2}$  in. apart. A sufficient factor of safety is provided to carry 4,000 lb. on the spring pads. The axle weighs 325 lb. without the wheels.

The construction is of the full floating type with two bearings in each wheel. These are standard size and can be furnished in the taper roll, ball, or straight roll designs. With straight roll bearings, thrust rings are also supplied.

The final drive is through a single set of spiral-bevel gears. Reductions from 4.9 to 1 to 5.5 to 1 can be installed. The main drive pinion is mounted between two ball bearings. This straddle type of mounting, it is said, will stand universal-joint whipping strain, as well as engine torque and gear pressures.

The differential, which is of the four-pinion type with spiral bevel gears, is mounted on two bearings of the same size and type as those used for the wheels. Gear adjustment is provided at the sides and



*Cut open view of single-plate clutch for 17-cylinder truck*

the inner end of the release sleeve is intended to permit free running of the retractor collar and the use of the clutch brake, while the bearing on the outer end takes the throwout thrust.

The friction facings, which are free to float in the flywheel, are made of asbestos reinforced with copper wire, and are of an endless spirally-woven type. The maximum area of friction surface and consequently long life are obtained, it is said, by using a low unit pressure on these facings. The type FJX clutch, which fits into a 14-in. flywheel bore, has a torque capacity of more than 410 lb.ft. It is thus powerful enough to be applied on double-deck buses, if required. Either unit power plant or amidship construction can be furnished.

The manufacturer recommends that the clutch be inspected at regular intervals and adjustments made before slipping starts. This is easily done by unloosening the two bolts which project through the cover plate. The adjustment ring carried by these bolts can then be turned in a clockwise direction. This changes the relation of the thrust shoes to the thrust ring so that the distance in which the wedge action takes place is shortened and thus the grip on the friction surfaces increased.

### Aluminum Wheel for Bus Service

THE wheel shown in the accompanying drawing, which was developed for high-grade passenger cars, is now being supplied for bus service. The makers, the Whitcomb Wheel Company, Kenosha, Wis., recently supplied the 32 x 6 wheels for the new Kissel coach, mentioned on page 498 of the September issue.

These wheels are of the "double curve" construction with a straight valve stem on the outside. The design may be adapted, however, so that an offset valve can be used. The 32 x 6 wheels weigh 26 lb. each, or 104 lb. for the set. It is said that a pressure of 56,000 lb. is required before they distort enough for fracture. The larger sizes are much stronger.

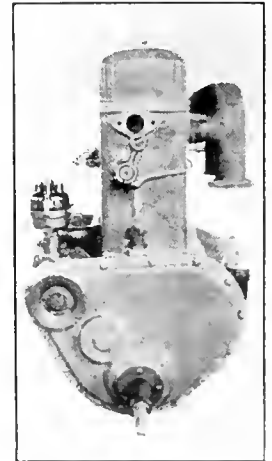
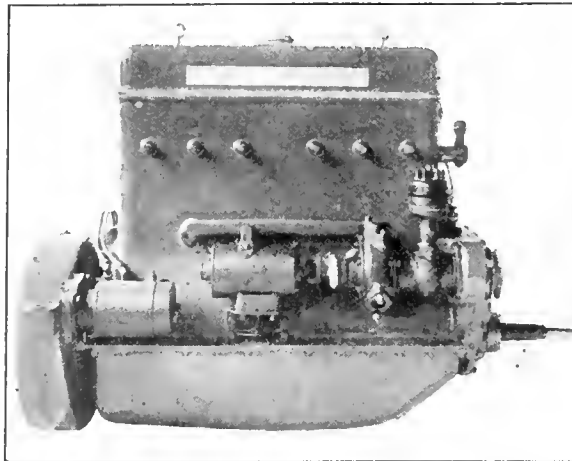
The material used is first-grade No. 12 aluminum alloy and virgin aluminum, subjected to special treatment after casting. According to the maker, this type of wheel weighs less

is no rumbling or drumming sound of any kind even on rough roads.

These wheels are built to take standard wood wheel hubs and standard demountable rims, so that they can be supplied for any kind of tire equipment.

### Six-Cylinder Engine for Single-Deck Service

THE Midwest Engine Company, Indianapolis, Ind., announces a six-cylinder engine which is recommended for bus service where high speed and smooth operation are es-



At left, Midwest Model 610 six-cylinder engine, 70-hp. capacity at 3,000 r.p.m.  
At right, front end of same engine, showing bracket for fan shaft

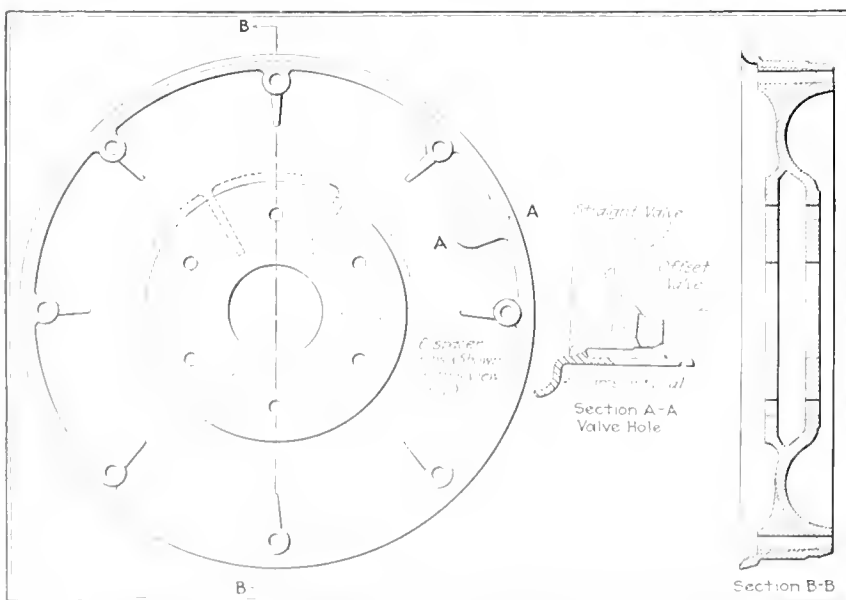
than other metal wheels, and also less than wood wheels, except the largest size of giant pneumatic tires. Other advantages of the aluminum wheel given are its beautiful finish, which requires no painting; ease of cleaning, and freedom from noise. There

is no rumbling or drumming sound of any kind even on rough roads. This engine, designated the Model 610, is particularly suited to intercity service on buses built along sedan lines.

With a 3½-in. bore and a 5-in. stroke, the total cylinder volume is 268.4 cu.in. The engine develops 70 hp. at 3,000 r.p.m., the torque being given as 155 lb.ft. at 400 r.p.m., 170 lb.ft. at 800 r.p.m., and crossing the 150 lb.ft. line at 1,900 r.p.m.

The two views given indicate the general construction. Overhead valves are located in a detachable head. Push rods are carried inside the cylinder block, and the entire valve mechanism is lubricated by oil mist and vapor forced up from the crankcase. Rocker arms are of the "rocker" type, carried against flat-headed adjusting screws. The surface on these arms is curved so that they actually rock like a rocking chair, a centering point in each being used to hold them in alignment.

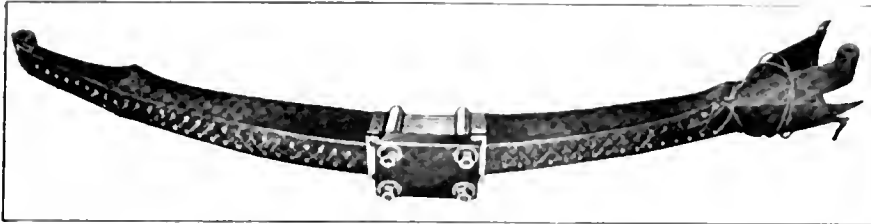
A special feature is the connecting-rod design, which is intended to eliminate as far as possible the effect of vibration. This is secured by making the H section on a taper, so that it becomes wider gradually



Double-curve wheel made of aluminum for 20-in. rim

as it nears the crankpin end. Then the sides of the H section weave in and out, with a thick section on one side opposite to a thin section on the other, so that vibrations may be broken up and prevented from concentrating at any one point.

Cooling is by pump circulation, the system having a capacity of 25 gal. per minute at 1,500 r.p.m. of the engine. The cooling water is directed by internal deflectors first to the spark plugs and then to the valves. The circulation, it is said,



*Anderson spring lubricator installed on semi-elliptic spring*

is controlled so that the greatest volume of water flows from the rear cylinder to the front through the head. This system is claimed to permit a higher cylinder compression than is possible with other types.

Lubrication is by a constant delivery system so that the pressure to all bearings is regulated in proportion to the load, instead of to the speed. This is accomplished by a regulating valve in the oil supply line and connected to the intake manifold above the throttle valve. The vacuum above the engine piston works against the control valve, this action being resisted by a coil spring mounted in the valve to act as a safety device on the pressure line. As the engine throttle is opened the vacuum in the manifold becomes less until finally the spring in the regulating valve is strong enough to close the oil valve. When this happens the free outlet to the oil system is cut off and the pressure raised on the entire oil supply line. Thus when the vacuum above the piston is low (full load on engine), the oil supply and pressure are greatest, no matter at what speed the engine may be operating at the time the load is applied. When the engine is idling, however, and the vacuum above the piston is high, then the oil pressure and supply are greatly reduced.

The camshaft is driven by a silent chain, with automatic adjustment. On the crankcase back of the water pump the generator-base pad is mounted so that the drive can be taken off the pump shaft.

### Cover for Spring Lubrication

**B**ASED on the theory that a certain amount of lubrication is necessary to the functioning of semi-elliptic springs, and also that they should be protected from dirt and water, is the cover made by the Anderson Spring Lubricator Com-

pany, Inc., Boston, Mass. This can be supplied either in artificial or in real leather. After being packed with a grease that will not cake or harden, the two parts of the cover are laced up under the spring. At the lower end is a sheet metal clip. This is slipped over the spring near the U-bolt. At the top is a buckle that clamps on the spring close to the shackle and thus keeps the cover fully extended and smooth.

Before attaching, the covers are thickly coated inside with grease. According to the manufacturer, no further attention is necessary and all the work of oiling or greasing the spring is done away with for at least two years, when the covers should be taken off and repacked. The covers act not only to keep the grease in, and to lubricate it more effectively than when oil is forced in

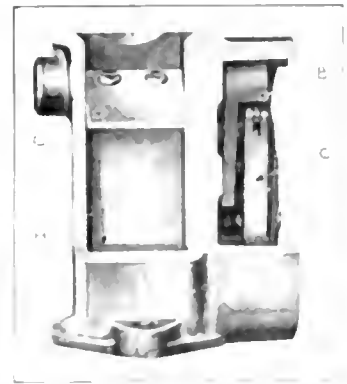
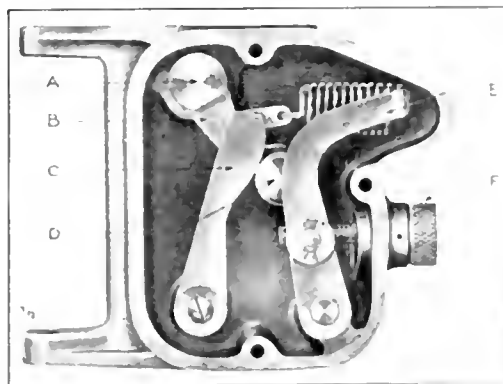
under pressure, but they also keep out dirt and water, and to a great extent decrease spring breakage.

### Throttle Balance Used in Engine Governor

**T**HE device made by the Handy Governor Corporation, Detroit, Mich., provides, it is said, a balanced condition of the throttle at the governed speed, regardless of the engine load. The two views show the essential features of the governor. A throttle control valve also acts as a plate on which the inlet gases impinge to set the governor mechanism at work. On the shaft of this valve or plate is mounted a throttle control lever which carries a cam roller. Resting on this roller is a control cam, which is spring connected to a speed-adjusting lever by which the rate of speed can be varied. All these levers and cams are in a chamber made integral with the rectangular inlet passage, which provides a dust-proof housing for the moving parts.

Variation in the engine speed is secured by adjusting the small screw shown in the left-hand view. If required, this can be sealed so that the governor speed cannot be changed without breaking the seal. A half-turn of this screw changes the engine speed about 75 to 85 r.p.m.

The operation of the governor is as follows: If the engine tries to run faster, the valve closes; if slower, the spring opens the valve wider. The valve, therefore, moves instantaneously to permit the proper quantity of gas to enter the engine so the speed is maintained regardless of load.



*Handy governor for controlling engine speed*

A—Throttle control valve shaft.  
B—Throttle control lever.  
C—Control cam.  
D—Control cam roller.

E—Speed adjusting lever.  
F—Speed adjusting screw.  
G—Throttle control plate.  
H—Rectangular inlet.

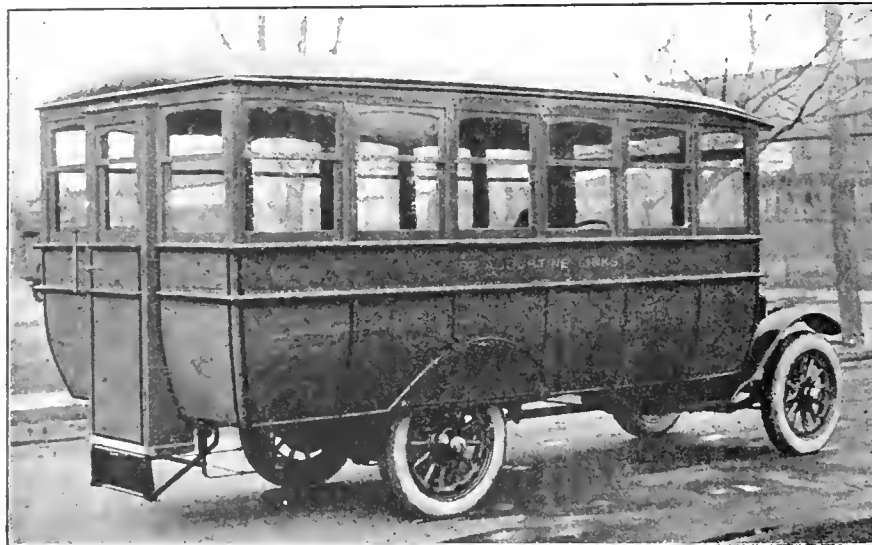
## Bodies and Equipment

### Bus Body for Hotel Service

THE bus body shown in the accompanying illustration, which is the No. 200 design of the Paterson Vehicle Company, Paterson, N. J., was built for the Florida East Coast Hotel

Inside the equipment includes slide windows, two Nichols-Lintern ventilators mounted in the roof, three dome lamps, and push buttons for electric signaling.

The finish of the ceiling and sides is walnut with nickel mountings.



*Body for Florida hotel service, of twelve-passenger capacity, entrance at rear only*

Company, one of the Flagler system hotels. It will be used to carry passengers between hotels in St. Augustine, Fla., and the St. Augustine Golf Links. Seating capacity is provided for twelve passengers. The chassis shown here is a General Motors Model K-16, fitted with pneumatic tires.

A feature of the body is the single entrance at the rear. This is provided with a wide door, and with one permanent step and also a supplementary step which can be dropped down for use when passengers alight directly into the street. For curb service the supplementary step is not required.

There are two longitudinal seats, 20 in. wide. These are 10 ft. long and are fitted with 8-in. woven wire spring cushions and spring lazy backs. Upholstering is black imitation leather.

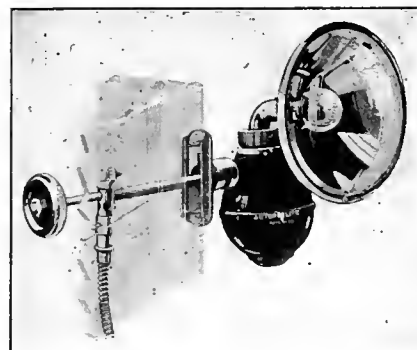
At the front to the right of the driver is a compartment for light baggage. The space is left open under the seats for golf bags, and a baggage rail will be mounted on the outside at the rear of the roof.

The main dimensions are as follows: Length over all 14 ft.; width at belt rail, 6 ft. 5 in.; headroom, 6 ft. 2 in.

Outside the body is painted in Valentine's elephant gray, striped with black and gold.

### Spot Light Controlled from Inside Body

THE Model F AutoReelite is a spotlight so designed that it can be controlled from inside the bus body, so it is unnecessary to lower a window to operate the light. As shown in the illustration the device is mounted on a corner post; the handle inside is used to direct the



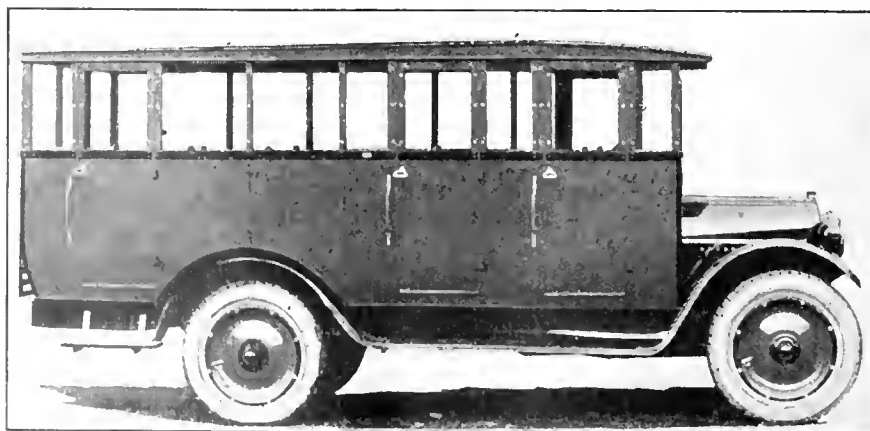
*Model F AutoReelite—has 12 ft. of cord stowed inside.*

rays in any direction. Another feature is the self-contained reel, which permits the light to be taken to any part of the vehicle. The maker of the light is the Appleton Electric Company, Chicago, Ill.

### Three Compartment Body of Charabanc Type

THE body shown in the illustration, as made by Hugh Lyons & Company, Lansing, Mich., is designed to carry seventeen passengers and a driver. It will be noticed that there are three doors on the right-hand side, each leading into a separate compartment. The first two have full-width seats, while the door at the rear admits passengers to a compartment with the seats arranged on three sides of a square. All of these are bolted to side posts through angle irons. This construction, it is said, braces the body securely; it also permits the use of a light top and thus lowers the center of gravity.

Framing is of hard maple covered with  $\frac{3}{8}$  in. hardwood and then with wadding, on which is mounted 20-gage auto body sheet steel. Doors are of the full molded type. Windows of the frameless type slide in felt



*Lyons seventeen-passenger char-à-banc-type body on Reo chassis*

channels. They are raised and lowered with straps and lace holders. The floor is covered with linoleum. Upholstering is of black imitation leather.

One Noble heater is mounted on the floor and connected to the exhaust. There are four ventilators, two at the front and two at the rear, of the lower type. Lighting is by three dome fixtures, one in the rear and one on each side. The interior

is mahogany finish with the lower part lined with imitation leather over a  $\frac{1}{2}$ -in. hard board. The painting of the outside is either battleship gray trimmed in black, or light Brewster green trimmed in black.

General dimensions of the body: Outside length, 13 ft. 6 in.; width, 6 ft. 4 in.; height inside 4 ft. 11 in. The weight of the body complete is 1,500 lb.

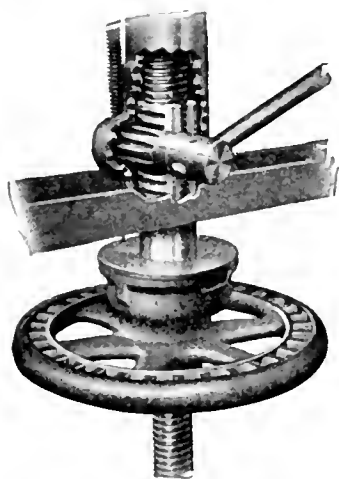
## Garage Time Savers

### Quick-Work Device Added to Garage Press

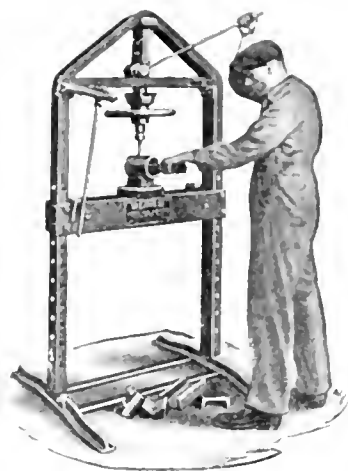
THE Hi-Speed press made by the Weaver Manufacturing Company, Springfield, Ill., now includes a rack and pinion, developed to facilitate lowering and raising of the screw.

The quick-work attachment is controlled by a lever, shown in the partial view, which when thrown over to the right, rapidly lowers the hand wheel and screw. The lever handle is attached to a pinion, which meshes into a sleeve over the press screw. A tension spring counterbalances the weight of the hand wheel and as a result, it is said by the manufacturer, facilitates the operation of the lever handle.

When pressures of more than 2,000



*Rack and pinion attachment for Weaver press.*



*Ratchet lever in use on Hi-Speed press.*

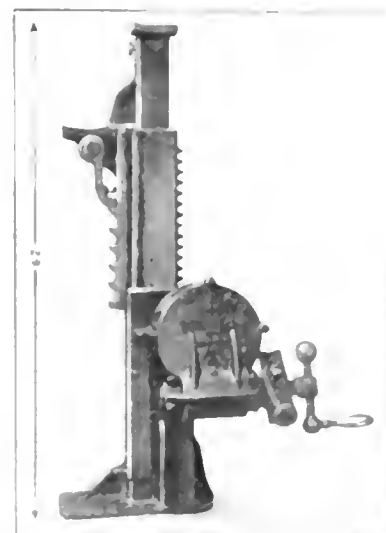
lb. of the two levers permit handling work requiring pressures of from 1 to 60,000 lb., without moving the work after it has been placed in position.

The regular high-speed press is made in two sizes, 32 and 42 in. between uprights. Included with the press is a face plate, two pressure blocks, two vise blocks and two sections of 6-in. channel steel.

### Gear-Type Jack of Ten Tons Capacity

THE Mosher heavy-duty jack, manufactured by the H. G. Paro Company, Chicago, Ill., is supplied for such work as changing pneumatic tires on heavy motor vehicles. The maker states that it is easy to operate, and is built so that the load cannot come down suddenly and injure the operator.

The driving mechanism consists of a worm gear and pinion gear made from one piece of steel. In the center of the jack is a socket where the handle can be carried for immediate use. This opening also can be



*Mosher heavy-duty gear-type jack.*

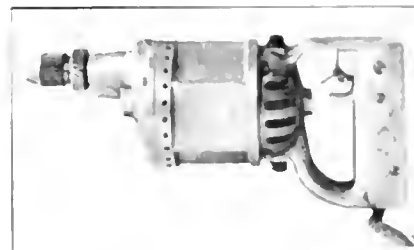
used to insert pressure-mounted blocks, to increase the height of the jack.

The top rest of the jack has an adjustment from 13 to 23 in., and this can be extended by additional fittings when it is desired to raise bus bodies. The side rest has an adjustment of from 6 to 17 in. of height. The jack complete weighs only 58 lb.

### Portable Drill with Grinding Attachment

THE Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md., has recently reduced the price of its 1-in. portable electric drill.

This drill, according to the maker, finds many uses in body and chassis work, and weighs 5 lb. complete.



*Black & Decker drill, 1 in., with trigger switch.*

The 1-in. capacity is for steel, but in hard wood it will drill 1 1/2 in. holes. For grinding work the hexagonal frame of the drill can be mounted in a special fixture. This fixture, or stand, and an emery wheel are supplied as an extra.

lb. are required, the screw is first brought down into contact with the work by the use of the hand wheel, and then the ratchet lever (shown in use in the full view) is thrown into engagement. This ratchet arm has two adjustments so that the com-







# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transporta-  
tion industry.

## Double-Deck Buses\*

Requirements of Bus Design and Equipment for City, Urban and Interurban Service Explained—Some of the Considerations Which Led to the Adoption of the Bus for Auxiliary and Special Service

By J. F. COLLINS

Chief Engineer Mitten-Traylor Company, Inc.

**T**RACKLESS transportation is not new. Centuries before steam railroads and trolley cars were known people traveled over the highways in horse-drawn vehicles. The present stages of California, though motor-propelled nowadays, take their name from the horse-drawn stages of pioneer days.

Bus transportation may be divided, generally, into three classes: city, interurban and country. The types of vehicle suitable for these services vary quite as much as the operating conditions themselves.

The country bus operating through sparsely settled sections over rough, unimproved country roads requires a chassis with high road clearance and usually a light-weight body that is limited in seating capacity and lacks riding comfort.

The interurban bus has been given much more thought. Safety is obtained by a low center of gravity consistent with the necessary road clearance, which on improved highways may be as little as 7 in. Special attention also is given to the comfort of riders, for the longer the trip the more comfortable must be the seats. Attention is also paid to suspension. Rugged springs, efficient as load carriers, but lacking in resilience have given way to more flexible springs.

Far greater attention has been given to the design of city buses than either the country or interurban type, for as soon as the automobile proved itself as a passenger carrying vehicle the bus operators of London, Paris, New York and Philadelphia turned to it as a means of meeting the urgent demands of their rapidly growing traffic. City buses are operated either as (1) a supplementary service to the trolley system on lines where the light traffic is insufficient to support the fixed charges, on avenues or boulevards where tracks or wires would be objectionable to the public, or in owl service where bus operation permits the shutting down of power plants; or (2) a de luxe service at a higher rate of fare, bridging the

gap between the trolley and the taxi, which may be operated without competition to existing trolley lines because of its higher fare. It will attract passengers who will not ride the crowded street cars but who will ride on the bus when assured a seat. Double deckers are used principally in this latter service and their loads are limited to their seating capacity.

In city service special attention must be paid to acceleration, low floor level and easy access, to facilitate boarding and leaving of passengers; adequate braking facilities on account of the density of traffic, and passenger comfort.

In selling transportation, the appeal to the passenger and the consideration of competition is just as important as in selling any other merchandise. Buses therefore must be comfortable, well lighted, free from noxious odors of the exhaust or the irritating fumes of raw gasoline.

A study of the double-decker for city service discloses many interesting features.

Starting at the ground we find either solid or cushion tires, chosen to obtain the lowest possible floor level. While cushion tires are more resilient and easier riding, solids save fuel for it takes power to manipulate or "flow" the softer rubber compounds. So in selecting a tire an attempt is made to obtain a mean between easy riding and fuel economy. Next, consideration is given to the tread where noiseless anti-skid qualities are sought. Continuous treads are satisfactory as regards quietness if the tread is arranged for maximum adhesion both rolling and sideways.

Wheels of not more than 34-in. diameter are used to obtain low floor levels. This is about the maximum diameter which can be housed under a seat.

The axles are cranked, bringing the spring pads considerably below the wheel spindle centers. At the rear axle power is transmitted from the drive-shaft within the housing by a bull pinion at its end to an internal gear attached to the wheel. The center differential is compactly housed, to obtain

maximum ground clearance under it, and minimum floor height over it. Bearing adjustments would be difficult to make on account of the heavy wheel and tire, were it not for the fact that the wheel is attached to a hub in a manner similar to a disk or wire wheel. Bearings are taken up and then tested by rotating the comparatively light hub rather than the entire wheel. With this arrangement tires or wheels can be changed without disturbing bearing adjustments or losing the wheel lubricant.

The suspension of a double deck bus presents several problems. The maximum passenger load will vary from 7,500 lb. for fifty persons to 9,000 lb. for sixty persons. Buses must ride well, whether loaded or light. At the same time, however, spring deflection is limited, for the unloaded step height at the rear platform must not be uncomfortably high when the bus is light. This is usually provided for with compound or differential springs.

Stability is vital with a double decker because of its high center of gravity. Securing stability without sacrificing riding qualities presents a problem in itself. In one of the largest double deckers remarkable riding qualities are obtained by mounting a helical spring at the rear of, and in series with, the flat spring. Stability is obtained by means of an equalizer so arranged that in event of an excessive load on one side of the spring, the one on the other side is immediately brought into play. This, of course, deflects both springs, and deflects them equally so that as the body drops its equilibrium is maintained.

Frame channels are kept low. On one bus they are only 18 in. above the ground. Low frame heights mean easy access, low center of gravity and consequent stability. With an 18-in. frame height the bulk of the chassis weight is below the wheel center. Practically all that weight is useful in steadying the body weight above the wheel center, much the same as a weighted keel serves on a racing yacht.

The size of bus engines is increasing. The tendency to maximum fuel economy is giving way to more power for quicker starting. Fuel saving is overshadowed by the far greater saving in labor and other expense accomplished by faster schedules. The six-cylinder engine is being looked upon with favor because of its even torque and freedom from annoying vibration.

Bus radiators assume large sizes because of the large power requirements of the vehicle. While it is possible to install six cylinders in place of four, without changing the cross-sectional area of the hood, the radiator area increases in direct proportion with the added power so we see the radiators of large buses rising up in front of the hood. Clutches must transmit the full power of the engine and yet have minimum mass so that gear changes may be made quietly without clashing.

Brakes are provided on both the rear wheels and on the propeller shaft. Brake

\*Abstract of paper presented before the Philadelphia Section, A I E E., Nov. 13, 1922.



controls are cushioned by compression springs at their ends so that the operator never pulls against a positive stop, either in pushing the foot brake pedal or pulling the hand lever. This reduces fatigue, and makes it possible to engage the next notch with the hand lever. Adjustments are made as simple as possible, usually by wing nuts accessible from the side of the bus.

In the transmission, special attention is paid to quiet gears. The ordinary truck type of transmission, with its roughly machined gears, was found to cause excessive and annoying noises. The transmission has at least four speeds forward and one reverse. The four speeds are essential to uniform acceleration. The need for additional steps of gear change is reduced where the six-cylinder engine is used.

The drive-shaft line consists of separate units. Since each unit has its own bearings the several sections are adequately supported, eliminating the whip that would ordinarily follow with such a long wheelbase construction.

In the low type construction, the vehicles are so close to the ground that a man cannot work under them with any comfort. All units are arranged to be taken down into a pit rather than lifted up through the floor. This eliminates the necessity of trapdoors in the bus floor, which are always undesirable because of the danger of slipping out of place and tripping the passengers.

The modern double-deck bus carries the entrance at the right-hand side of the rear platform. The conductor stands in a semi-circular pocket formed by the winding stairway which starts at the left-hand side and rises to the right-hand side of the upper deck. This arrangement provides for pay-as-you-enter fare collection. A periscope is provided so that he may see at all times the number of seats occupied on the upper deck.

The lighting, wiring and signal circuits are carried within the advertising rack, all wiring being done on a bench before the advertising rack is secured into place. The wires are then connected to the proper switches. This facilitates not only the original wiring of the vehicle, but also the clearing of short-circuits or grounds.

The conventional automatic ventilator used on trolley cars and single-deck buses cannot be installed on double-deck buses, on account of the floor of the upper deck. Ventilation is secured by the installation of louver panels above the windows, or by means of a small tilting sash. This is hinged at the bottom so that cold air entering is carried up past the tilted sash, which drops against the advertising rack, then over the advertising rack into the aisle. This ingenious arrangement prevents dust from the street settling on the advertising cards, which are thereby kept clean, and also saves the passengers seated at the windows the annoyance of cold air blowing directly on them.

Standard bus heating consists of two

### Motor Bus Organizations

NATIONAL MOTOR TRANSPORT ASSOCIATION, President, John H. Kelly, Secretary and Harris L. Kelly, Vice Presidents, 115 Madison Street, New York 16, New York. Telephone, MU 2-6600.

Model CARRIERS: Aerial  
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CONNECTICUT MOTOR FUEL  
ASSOCIATION The Hartford  
Hotel, Hartford, and Atlantic  
Hotel & Waterbury. Treasurer,  
Fred W. North Main Street, Waterbury.  
General Secretary, Edward J. O'Neil,  
Hartford. Chairman, T. A. Thompson,  
Hartford. Chairman

FLORIDA BUS ASSOCIATION  
President: Joseph L. A. D. H. C.  
President and general manager: Wm.  
E. L. L. T. T. F.

GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION, President, E. A. Harrison, Eastbrook, Ga.; Secretary, W. M. Riley, 1904 Georgia

INDIANA MOTOR BUS OWNERS ASSOCIATION, President H. E. Long, General Manager, Johns' Bus Line, 400 North 10th St., Ellettsburg, W. V. Road Coach, General Manager, Indiana Motor Bus Company, Ellettsburg, Ind.

MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION: President, E. Foster Morton, president Morton Trucking Company, Thaw Street, Howard Streets, Detroit, Michigan; H. H. Hardy, Lansing, Michigan.

MINNESOTA MOTOR BUS ASSOCIATION: President, Rodney S. Funnick, president Touring Car Line Company, Minneapolis; Minn. secretary, Carl E. Jackson, St. Paul, Minn.

**NEW JERSEY AUTO BUS ASSO-**  
**CATION** President, George F. Se-  
nault, Jr., Newark, N. J. Secretary,  
George L. Cowan, 20 Clinton Street,  
Newark, N. J.

NEW JERSEY BUS TRANSPORTATION ASSOCIATION, President Charles Gallagher, 66 Bartholomew Avenue, Jersey City, N. J.

**AUTOBUS ASSOCIATION OF NEW YORK STATE:** President, Allen V. Parker, treasurer, Frontier Auto Transport Company, Niagara Falls, N. Y., secretary and treasurer, James L. Dodd, president, Rochester Bus Lines Advertising Corporation, 120 Vermont Avenue, Rochester, N. Y.

OHIO MOTOR BUS ASSOCIATION  
President, R. E. McCullom, Columbus,  
Ohio; Secretary, C. J. Randall, Colum-  
bus, Ohio.

PENNSYLVANIA BUS ASSOCIATION President, Frank Martz, treasurer, White Transit Company, Plymouth, Pa.; treasurer, W. J. Emerick, president, Emerick Bus Lines, Bellefonte, Pa.

WISCONSIN MOTOR TRANSPORTATION ASSOCIATION: President A. C. Hornum, president A. C. Hornum & Co., Menasha, Wis.

pressed metal shrouded radiators installed at the front end of the bus. This location has been found best, since it heats the air coming in at the front of the vehicle before it reaches the passengers.

### Reforms Advocated in Selling of Tires

**A**T A meeting of the Greater New York Tire Dealers' Association, held on Dec. 13 in New York City, George J. Burger, president of the newly-formed National Tire Dealers' Association, delivered a straight-from-the-shoulder message regarding dealer and manufacturer relations. The dealer, he

[illegible]

When the defendant arrived at the house at the meeting, there was no one there to discuss the defendant's offer. The defendant's car drove around the property for a while, the former big man told the jury. He believed that at some point the defendant could swing around and see the house, the owner, and the other people in the yard. The estate's attorney told the jury that the defendant was not looking for his car.

## N.M.T.A. Helps Form State Associations

**S**INCE the organization of the State National Motor Transportation Association is outlined in the December issue of *BUS TRANSPORTATION*, Manager E. B. Burnett reports that he has been instrumental in the formation of a Pennsylvania state bus association. He has also actively presented a membership campaign, so that a number of bus companies have been taken into membership in the national association. It is now proposed to create a new form of membership for state bus associations, which will pay dues based upon the number of their members.

On Dec. 18, Mr. Barratt met with several of the motor bus operators of Pennsylvania at Harrisburg to formulate plans for a state organization. The following officers were named: President, Frank Maitz, Treasurer, The White Transit Company, Plymouth, Pa.; Treasurer, W. J. Enoch, Jr., Port Jervis, N. Y.; Secretary, J. H. Egan, The Erie, Pa. Line, Bellefonte, Pa. At another meeting held Jan. 4 at the Bern-Harris Hotel in Harrisburg for the purpose of more fully perfecting the organization, plans were mapped out for the coming year. Details of this meeting will be given in a future coming issue.

At Wilmington, Del., on Dec. 22, Mr. Burrett met with a group of 15 operators of that section and discussed the formation of an association for Delaware. C. S. Wooten, of Delaware Rapids, Tenn., is chairman, and an active organizer at the meeting. A plan was organized to broaden the local Wilmington association soon to take in members from all over the state. Active steps will be taken in the near future to perfect the state organization.

## National Association with State Representation Favored in California

Members of California Motor Carriers' Association Favor Supporting N. M. T. A., but Do So with Hope of Remolding Policy—Board of Directors Takes Favorable Action on Committee Report Concerning the Subject

**R**ATHER than propose and undertake the formation of a new national association, the California Motor Carriers' Association, at its annual meeting on Dec. 13, decided to support and work with the recently organized National Motor Transport Association, but in doing so made a forceful recommendation that the plan of representation in that organization be changed to one more consistent with the best interests of the industry. The report of the committee, which was later adopted by the board of directors, is as follows:

After careful consideration of the plan of organization proposed by the National Motor Transport Association, and in accordance with the sentiment of members expressed at the annual meeting of the California Motor Carriers' Association in San Francisco Dec. 13, 1922, your committee finds:

1. That the election of W. E. Travis, president California Motor Transit Company, to represent the motor carriers of the State of California on the board of directors of the National Motor Transport Association should be heartily approved.

2. A study of the by-laws adopted at the organization meeting of the National Motor Transport Association shows its plan of organization to be of a sort that we believe will not work out satisfactorily as to class A membership, nor will it fill the needs that should be filled by a national organization for the following reasons:

(a) A membership made up of individual operators from the various states, if such a membership could be secured, would tend to demoralize the state organizations because the large majority of carriers are not in a financial position to support two such organizations.

(b) It would seem to us that the state organizations are the present vital necessities and should be the media through which the national organization operates. This is a principle which we believe has been the most successful where relationship between state and national organizations is maintained.

(c) The state organizations must perforce be the militant bodies in all state matters, while the national organization should render valuable assistance to all state organizations, somewhat as would a holding company to its subsidiaries. As an example of the proposed relationship, citation is made of the American Telephone & Telegraph Company, a non-operative company, in its relations to the various subsidiary operating companies, such as the Pacific Telephone & Telegraph Company.

Among the important services to be rendered by a national association for which there is immediate need are the development and presentation of uniform laws and active support of the state organizations in their endeavors to secure the enactment of such laws the collection of national data relative to operations and conditions of service, regulations, taxes, and many other subjects on which so young an industry as that of motor transportation requires information and aid.

A national organization that would perform such service would be invaluable, could warrant the support of all state associations and could be financed by the state associations without creating undue hardship on the small individual operators. Provision should be made of course for representation in the council of such a national association from states where state organizations do not at present exist pending the formation of such state organizations.

In conclusion we respectfully submit:

1. That a national organization is a necessity and

2. That not being wholly satisfied with the program proposed by the National Motor Transport Association, we should nevertheless endeavor to support and work with that organization with the purpose of molding its plan and policy into a form

which will more properly fit the national needs and offer to the industry a national organization on a more substantial and enduring basis, and finally that

3. The president of the California Motor Carriers' Association should be instructed, through his membership on the board of directors of the National Motor Transport Association, to lay these matters before that association and before all state associations.

### The Place of the Bus Told at Akron

**T**HE motor bus may have a fixed place in the transportation system today in large American cities, but motor buses will never entirely supplant street railway systems, according to Albert S. Richey, consulting engineer, Worcester, Mass., in an address before the Kiwanis Club of Akron, on Oct. 27. The future success of operations of street railway system in cities of over 50,000 population depends upon their being given a virtual monopoly of the transportation business.

Referring to Akron, he said that if the tracks were taken up, buses would fall down miserably, as they could not

handle the traffic. The street cars now handle 125,000 passengers a day, the peak load being in the morning and evening, when fully 100,000 ride the cars. It would take over 500 buses to handle that transportation and they could not do it as speedily as the street cars, especially as enough street space to permit so many buses is not available in any city.

Where a headway of not less than fifteen minutes is required, the bus is valuable as an auxiliary to the street car, but where a greater frequency of service is necessary the street car can do the work more economically and profitably. The street car makes a more economical use of space than the motor bus.

Speaking of the average street car fares in the United States, he stated that in 1917 it was 4.85 cents and that most cities had a 5-cent fare or gave six rides for 25 cents. The maximum car fare has since risen to 10 cents while the average fare increased to 7.25 cents eighteen months ago. Since that time it has receded to about 7 cents. Akron is one of the few large cities with a 5-cent fare and no extra charge for transfers.

Closing his remarks he pointed out that the motor bus would give its maximum service in auxiliary work in building up transportation service in new territories until street car lines could be established.

## Automotive Production Discussed at Detroit

S. A. E. Takes Up Gear Making and Selection of Machine Tools — Visits to Important Plants Feature the Meeting—Closer Contact of Production Men, Engineers and Service Men Urged

**T**HE first production meeting of the Society of Automotive Engineers, held on Oct. 26 and 27 in Detroit, brought out manufacturing men from many sections of the country. At the two sessions papers were presented by production executives from the Packard, Studebaker, Ford, Franklin, Willys-Overland and General Motors organizations. Visits were made to the Ford River Rouge plant, and to Packard, Cadillac and Dodge factories.

Of greatest interest to bus operators was undoubtedly the discussion of gear manufacture. How to eliminate, or rather reduce, for a complete cure is perhaps too much to be hoped for, the hum, sing, knock, rattle, howl, from present-day gears! The best method, it was said, was to attack the biggest noise, and then work on the others. Close fitting has become a fetish, another speaker held, and has led to an almost complete lack of consideration of the oil film which must be carried between the gear teeth. K. L. Herrmann of the Studebaker Corporation showed, by a screen reproduction of actual gears, how the errors in cutting, tooth form, tooth spacing lead to diffi-

culties. Faulty gear manufacture, he said, is costing automobile makers at least \$11,000 a day at the present time.

The selection of machine tools was the subject of a paper presented by A. J. Baker of the Willys-Overland Company. The automotive industry, he said, has no system of training workmen and consequently machinery must often be used by the greenest of help. Consequently there should be greater simplification and use of standard machine tools to a greater extent; these can always be kept in service by slight changes in the tools and fixtures. At present, time is often the deciding factor in the selection of tools; special equipment is put in to save time only, when as a matter of fact the cost should be the first and final test in buying new equipment.

At a dinner held on Oct. 26, Pierre S. DuPont, president General Motors Company, and A. B. C. Hardy, president Old Motor Works, emphasized the need for closer contact between the production men engaged in manufacturing, the engineers designing the vehicles, and the service men who must keep them in satisfactory operation.

## Highway Lighting, Loading and Building

## Michigan Convention Discusses Vital Problems Affecting Motor Vehicle Use of Rural Highways

**A**T A JOINT SESSION of the North Central division of the National Highway Traffic Association and the Michigan State Good Roads Association, held on Nov. 21 in Grand Rapids, Mich., papers were presented discussing the important problems now confronting motor vehicle operators. Regulations covering speeds, weights and dimensions of heavy motor vehicles were explained by George H. Pride, president Heavy Haulage Company, New York. The regulation of overloading was treated by David C. Fenner of the International Motor Company, New York. David Beecroft, vice-president of the National Highway Traffic Association, presented a paper on lights for highway vehicles. The equitable distribution of maintenance and construction costs of highways was dealt with by Roy D. Chapin, president Hudson Motor Car Company, Detroit. A paper, abstracted below, on the economic value of highway transport franchises, was presented by Arthur H. Blanchard, professor of highway engineering and highway transport at the University of Michigan.

## REGULATION OF OVERLOADING

The overloading of motor trucks, said Mr. Fenner, is due in part to the improper basis of rating, and to the classifying of the chassis in terms of the manufacturer's rated load capacity. The user soon learns that this rating really does not mean anything. He purchases a chassis, attaches the body, which may or may not fit either the chassis or the commodities to be carried, and then loads this truck to suit himself. To overcome this vehicles are equipped with a manufacturer's caution plate properly stamped with the actual weight of the chassis, body and load capacity. It is now proposed to go a step further and indicate on this plate the maximum allowable gross load for the front axle, the maximum allowable gross load for the rear axle, the maximum allowable speed, and the distance in which the vehicle loaded to capacity can be stopped with each set of brakes operated independently and with the vehicle running at maximum speed on hard, dry, level roadway.

Investigations conducted in some of our states show that the light and medium capacity vehicles are overloaded to a greater extent and in greater numbers than the heavy capacity vehicle. This indicates the importance of restricting loads per inch width of tire per wheel and per axle. We must recognize the four classes of tire—pneumatic, cushion, solid rubber and metal—for regulating speeds and determining license fees according to wheel load. We must restrict the minimum thickness of solid and cushion tires when measured between the tire flange and a flat metal surface on which

the wheel stands. We must also take into account the condition of tires.

Mr. Fenner closed with an appeal to the operators to stamp out completely the practice of overloading. The motor vehicle industry, he said, stands firmly behind the rigid enforcement of existing state laws. It condemns overloading and overspeeding unreservedly and will cooperate actively in every movement to regulate loads and speed of motor trucks on the highways.

## LIGHTS FOR HIGHWAY VEHICLE.

The lighting of vehicles is only one factor in making the highways safe, according to Mr. Beecroft. Other essential ones are road lighting systems, day and night road signals, and highway equipment in general.

The experience of motor vehicle law enforcement authorities in different states indicates that motor cars are too often over-lighted and motor trucks generally under-lighted. We rarely meet with the motor truck with dazzling headlight, but too frequently we meet the inefficient pair of oil lights on the truck, lights that are not adequate and are in reality useless except as signal lights.

When a 15-ft. highway is built, we have not finished the job. It should be made ready for use, not merely in daylight hours, but during as many hours of the night as the needs of the time demand. Mr. Beecroft believes that the rural highways require traffic control, surface marking, night signals, just as much as the city streets. He advocates a steady green light for highway signal purposes, with height, location and color standardized.

The use of two lights on the rear (a practice often followed with buses) is confusing and merely doubles the num-

ber the driver has been injured, he will have to wait. A trucker's first thought should be passed up the road to the left hand side of the road where it is impossible due to lack of knowledge as to what to do next and a white path through the dense dirt along the edge of the road leads to the extreme width of the road.

The operation of the waveguide is similar to that of a waveguide with a dielectric core. The waveguide is long enough for the wave to reflect off the walls several times before it is attenuated by the lossy material, and the wave is reflected back and forth many times.

LEONARD B. LIPSON  
HARVARD UNIVERSITY

The need for a more efficient and cleaner way of transporting goods by rail matters. We are not only more concerned with the environment, but also are dealing more and more with the problem of transportation of hazardous materials. In fact, the railroads are the only mode of transporting hazardous materials in the motor vehicle fleet.

In 1867, the first water turbine in the country, is detailed for the first time used. We can suppose, however, that adopt certain details of the turbine, what Mr. Chapuis expressed as follows:

1. Highway system should be operated by state highway departments with a definite view to state control of the social and economic needs of the community with it.
2. The needed revenue for construction should be secured from general tax-bond issues, based upon general taxation, while current operating expenses should be secured from the user and should be adequate to maintain the highway once constructed.
3. Centralized administrative action is essential to a proper development of these systems as well as to the regulation of their use, and broad powers should be granted the state department in charge, to the extent of "flow of traffic."

## Highway Transport Franchises\*

BY ARTHUR H. BANSCHKE

Fig. 1. Plot of  $N$  (a) and  $H$  (b) versus  $T$  for  $\alpha = 0.5$ ,  $\beta = 0.5$ ,  $\gamma = 0.5$ ,  $\delta = 0.5$ ,  $\epsilon = 0.5$ ,  $\zeta = 0.5$ ,  $\eta = 0.5$ ,  $\theta = 0.5$ ,  $\iota = 0.5$ ,  $\kappa = 0.5$ ,  $\lambda = 0.5$ ,  $\mu = 0.5$ ,  $\nu = 0.5$ ,  $\xi = 0.5$ ,  $\omicron = 0.5$ ,  $\pi = 0.5$ ,  $\rho = 0.5$ ,  $\sigma = 0.5$ ,  $\tau = 0.5$ ,  $\upsilon = 0.5$ ,  $\phi = 0.5$ ,  $\chi = 0.5$ ,  $\psi = 0.5$ ,  $\omega = 0.5$ ,  $\eta = 0.5$ ,  $\theta = 0.5$ ,  $\iota = 0.5$ ,  $\kappa = 0.5$ ,  $\lambda = 0.5$ ,  $\mu = 0.5$ ,  $\nu = 0.5$ ,  $\xi = 0.5$ ,  $\omicron = 0.5$ ,  $\pi = 0.5$ ,  $\rho = 0.5$ ,  $\sigma = 0.5$ ,  $\tau = 0.5$ ,  $\upsilon = 0.5$ ,  $\phi = 0.5$ ,  $\chi = 0.5$ ,  $\psi = 0.5$ ,  $\omega = 0.5$ .

THE legal right of the state to control the operations of common carriers is generally admitted, except in the case of inter-state common carriers. At the present time, at least twenty-two states provide in their statutes for some degree of state control over motor vehicle common carriers.

Are highway transport franchises an economic and public necessity? To those familiar with the development of the commercial transportation of commodities and passengers by motor vehicles during the past fifteen years in the United States and the larger his-

\*Abstract of paper presented at 1987 meeting National Highway Traffic Administration (North Central Division) and Midwest State Good Roads Association held in St. Louis, MO.

But, if the number of  $\alpha$  is not equal to the number of  $\beta$ , then the number of  $\alpha$  is not equal to the number of  $\beta$ .

[illegible]

### Meetings, Conventions and Exhibits

Jan. 6-13	New York, N. Y.	National Automobile Show, auspices of the National Automobile Chamber of Commerce, Grand Central Palace.
Jan. 8-13	New York, N. Y.	Auto Body Builders' Show, Mgt. Automobile Body Builders, New York City.
Jan. 9-12	New York, N. Y.	Society of Automotive Engineers, Annual Meeting.
Jan. 13-22	Oakland, Calif.	Oakland Automobile Show, R. W. Martland, 47 Pacific Bldg., Oakland, Calif.
Jan. 13-20	Philadelphia, Pa.	Philadelphia Automobile Show, C. C. Bulkeley, Broad and Callowhill St., Philadelphia, Pa.
Jan. 15	Topeka, Kan.	Automobile Trade Assn. of Kansas, Phil. E. Zimmerman, Topeka, Kan.
Jan. 15-19	Chicago, Ill.	Thirteenth American Good Roads Congress and Fourteenth National Good Roads Show.
Jan. 20-27	Cleveland, Ohio	Cleveland Automobile Show, auspices of the Cleveland Automobile Manufacturers' and Dealers' Assn., New Public Auditorium; Herbert Buckman, Manager.
Jan. 22	Douglas, Ariz.	Arizona Good Roads Assn., H. Welch, care Chamber of Commerce, Phoenix, Ariz.
Jan. 23	York, Pa.	Annual Automobile Show, auspices Automobile Dealers' Assn., Overland Garage; A. H. Geesey and H. Schroeder, Managers.
Jan. 28-Feb. 3	Chicago, Ill.	Chicago Automobile Show, S. A. Miles, care N.A.C.C., Forty-sixth Street and Madison Ave., New York, N. Y.
Jan. 29-30	Chicago, Ill.	National Automobile Dealers' Assn., C. A. Vane, 320 N. Grand Ave., St. Louis, Mo.
Jan. 29-Feb. 3	Ann Arbor, Mich.	Automobile Show, auspices of the Washtenaw County Auto Dealers' Assn., Jos. Thompson, Secretary.
Jan. 29-31	Chicago, Ill.	Annual Meeting Automotive Electric Service Assn., Congress Hotel.
Jan. 31	Chicago, Ill.	Meeting and Dinner Society Automotive Engineers, Congress Hotel.
Jan. 15-16	Atlanta, Ga.	Georgia Motor Bus and Transportation Assn., Piedmont Hotel; W. M. Riley, Secretary.
Jan. 9-10	Cincinnati, Ohio	Ohio Motor Bus Assn.

and the operation and maintenance of equipment.

As an integral part of the essential transportation system of America, it is absolutely necessary that highway transport be placed upon a sound business basis in order that responsible operators may be protected and that this branch of common carrier service may be conducted in such a manner as will guarantee to the public constant, efficient, economic service.

From the standpoint of public safety, the state must insist that our motor vehicle common carriers transporting passengers provide a maximum degree of safety to the traveling public and eliminate reckless driving by inexperienced chauffeurs and the utilization of wholly inadequate motor vehicle equipment which may be characterized in some cases as a piece of junk carrying a packing box in which persons are jammed, the resulting contrivance being called a motor bus.

Based on an analysis of all state statutes covering the control of motor vehicle operation, the powers given to state public service controlling bodies may be classified according to the following:†

1. Grant, refuse to grant, amend or revoke certificates of public convenience and necessity.
2. Prescribe routes.
3. Fix schedules.
4. Determine character of service and promote the comfort and safety of traveling public.
5. Establish fares and rates.
6. Require reports and uniform methods of accounting.
7. Examine accounts and records.
8. Supervise fiscal affairs such as incorporation, capitalization of stock, etc.
9. Compel additions to, extensions of or betterments in, physical equipment.

If the powers enumerated are given to a state controlling body, what should be the qualifications of the members of

such a body? It is evident that a grave responsibility to the public and to highway transport business will rest upon them. They should be men possessing vision, judicial minds, and a broad knowledge of transportation, and should be unprejudiced pertaining to the relative development of railway, waterway and highway transport. Different fields of public and business affairs should be represented. An efficient controlling body might be made up of the Attorney General of the state as an ex-officio member; a highway transport man of high standing and possessing a broad knowledge of the development of all phases of transportation of commodities and passengers by motor vehicles; an experienced highway engineer, who understands the fundamentals of highway transport and who thoroughly comprehends the relationship existing between the economic operation of highway transport and such highway factors as grades, alignments, widths, drainage, foundations, the character and maintenance of roadway surfaces, and the methods of controlling and directing the operation of traffic on highways; a business man who has dealt with big commercial problems; and a banker who is familiar with the practice of bonding common carriers and other enterprises in connection with the operation of which the public must be protected. To this group of five might be added a steam railroad man and an electric railway man provided that they possess a broad vision relative to the development of transportation in America.

In conclusion, it may be said that, in the opinion of the writer, the highway transport operator of sound financial standing, who is endeavoring to render to the public an efficient, economical and safe transportation service, will welcome the passage of state laws relative to highway transport franchises provided that they are based and administered on the principles which have been herein outlined.

### Body Builders' Convention

**I**N CONJUNCTION with the second National Automobile Body Builders' Show, which is to be held in New York, Jan. 8 to 13, the annual convention of the Automobile Body Builders' Association will be held Thursday, Jan. 11, in the Assembly Room of the Twelfth Regiment Armory, Sixty-second Street, west of Broadway, New York City. It is anticipated that a large number of members from all over the country will be present at the convention, which will serve as a clearing house of ideas for the industry.

Among the speakers will be Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who will discuss the general possibilities for the industry in 1923. John C. Howell, industrial statistician of the Brookmire Economic Service, will address the meeting on "Present Financial and Business Conditions." Mr. Howell, who has made a life study of economics and the factors controlling market conditions, will give a forecast of the future of the automobile industry for the next six months. "Standardization" is the topic of an address to be delivered by L. C. Hill, assistant general manager Society of Automotive Engineers, who is well fitted to discuss the automotive standardization movement.

### Road Builders to Meet in Chicago This Month

**T**HE thirteenth American Good Roads Congress and the Fourteenth National Good Roads Show will be held under the auspices of the American Road Builders' Association in Chicago, Ill., Jan. 15 to 19. The meetings will be held in the Congress Hotel. The show will be in the Coliseum and adjoining buildings, as in previous years.

Among the speakers at the Congress is Thomas H. MacDonald, Chief United States Bureau of Public Roads who will talk on "Continued Highway Expenditures Required to Meet Traffic Demands of the Future," which is scheduled for Tuesday, Jan. 16, the opening session. The Tuesday afternoon session will be devoted to the general topic "Design." Speaking upon "What Test Road Results Have Taught Us," Clifford Older, State Highway Engineer of Illinois, will discuss the Bates test road; Lloyd Aldrich, consulting engineer, San Francisco, Calif., will tell about the Pittsburgh test results, and the Arlington tests will be discussed by A. T. Goldbeck of the United States Bureau of Public Roads.

At the Thursday session, which will be devoted to a study of general traffic, a topic of absorbing interest to bus men, "Changes Needed in Motor Vehicle Legislation and License Fees," will be discussed in papers by J. N. Mackall, Commissioner of Roads, Baltimore, Md.; Leon C. Herrick, Director of Highways, Columbus, Ohio, and Harry Meixell, Jr., National Automobile Chamber of Commerce.

†Report by Motor Vehicle Conference Committee, March 1, 1922.

# News of the Road



From wherever the bus runs, are brought together the important events, here presented to show the movement of the day.



## 491 Applications in Year

Figures Prepared by the Automobile Stage Department of the California Railroad Commission Indicate the Rapid Development in the Bus Field—Review of Important Decisions

THE extent of the growth of the auto as a public carrier in California is strikingly illustrated by figures prepared by the automobile stage department of the Railroad Commission for inclusion in the report of that body for the year, July 1, 1921, to June 30, 1922. During that period there were 491 formal applications filed with the Railroad Commission for certificates of public convenience and necessity or for permission to transfer existing franchises. During the same period there were twenty formal complaints filed, the majority of which allege either illegal operation on the part of operators not holding certificates or illegal operation on the part of holders of existing operative rights heretofore granted to them.

During the year 427 public hearings were held by the commission on matters affecting stage lines and 568 decisions rendered. Of the decisions rendered several were of extreme importance in that they laid down a policy to which the commission was committed in handling future cases of a similar nature. Chief of these is decision No. 9,065 in case No. 1,442, A. B. Watson vs. O. R. Fuller. This was a complaint brought to restrict operation of defendant as regards rendering service to certain intermediate points over a through route which defendant at the time operated. This operative right was acquired through operation prior to the effective date of Chapter 213, Statutes of 1917, and the commission held that defendant did not have the right to accept or transport passengers between two intermediate points when it was shown that the original tariff filed by said defendant did not provide a rate for such local service nor had the defendant at the time attempted to render service between the two local intermediate points named. The commission further held that an automobile stage company could not render, at its own discretion, a local service under an operative right authorizing a through service, unless such stage company had first secured a certificate from the commission authorizing it to so engage.

Under decision No. 9,892 in applications Nos. 8,274-5,361, the commission held that an automobile stage line which had secured two connecting certificates could not at its own discretion operate a through service over two or more of such connecting certificates

unless it had first secured a new certificate from the commission authorizing the through service proposed.

During the latter part of the year 1921 a formal complaint was filed with the Railroad Commission by the Motor Carriers' Association, being case No. 1,638. This complaint named a number of individuals and companies which it was alleged were operating an automobile passenger stage service between San Francisco and Los Angeles without having first secured a certificate of public convenience and necessity from the commission. At the hearing upon this matter a number of the defendants, while admitting that at the time they had transported passengers between San Francisco and Los Angeles for compensation, contended that they did not come within the provisions of the automobile stage and truck transportation act, due to the fact that they were not engaged solely in that particular business and were what they termed rent car operators; that is, willing to go anywhere at any time an individual or party hired their car for a trip. The evidence, however, clearly showed that certain of said individuals advertised frequently in the daily papers both at San Francisco and Los Angeles, holding themselves out as willing to transport passengers between two terminals named for compensation and they actually were, and did engage, regularly in such business, although at infrequent occasions trips were made to other points. The commission held such operation to be illegal and in violation of the provisions of Chapter 213, Statutes of 1917, as amended, and under the commission's findings a number of arrests were made and convictions secured which eventually put a stop to this method of operation.

In past years it had been the policy of the commission to grant by *ex parte* order practically all applications for permission to transfer existing operative rights. During the last year, however, the commission has adopted a new policy in this respect in that it requires that evidence be submitted by applicants to the effect that the proposed purchaser is financially able to render as good if not better service than that heretofore rendered by the proposed seller. Several applications to transfer existing operative rights have been denied when the evidence showed that the proposed purchaser was not in a finan-

cial position to continue to render an adequate service, principally due to the fact that he was supplied with a very limited amount of capital, and under the terms of the agreement of sale he was not only required to pay a substantial price for the physical equipment proposed to be transferred, but also a substantial price for the operative right, which was granted or given without cost by the people of the State.

On June 30, 1921, there at that time scheduled of 771 automobile stage and truck lines were on file with the commission. The automobile stage department of the commission was started on June 1, 1921, and during the year of its operation it had endeavored to weed out a number of dead lines heretofore carried in the file. The number at the present time has been reduced to 726.

Due to the very nature of the automobile stage business, it is difficult matter to keep track of the numerous lines in operation in this State; all other classes of public utilities have their plants firmly anchored and cannot move in a night, while the majority of smaller stage operators, owning but one passenger machine, may, if business is poor and shows no definite signs of improvement, pick up and drive off in search of some other method of livelihood.

Section 5 of the automobile stage and truck transportation act prohibits the sale, assignment, lease or transfer of an operative right without the written approval of the Railroad Commission, and in all certificates granted by the commission a clause is inserted to the effect that service cannot be abandoned or discontinued without written authorization. Nevertheless, the small operator, if business is not good, appears to pay little, if any, attention to such provisions, and as it is practically impossible to trace such parties the commission has been unable entirely to stop this practice of unauthorized abandonment of service.

By the enactment of Chapter 213, Statutes of 1917, the Legislature of the State of California provided for the supervision and regulation by the Railroad Commission of all automobile stage and truck lines engaged in the common carrier of persons or property over a regular route or between fixed terminals. This statutory enactment was amended by Chapter 286, Statutes of 1919, to include within the term "common carrier" any person or persons or property for compensation over a regular route or between fixed terminals and to include within the limits of an incorporated city or town.

## Extensive Plans for St. Louis Service

Richard W. Meade to Take Charge of  
United States Bus Transit Corpora-  
tion—Service Will Start April 1.

THE United States Bus Transit Corporation was incorporated Nov. 12, 1922, under the laws of the State of Delaware with a capitalization of \$3,000,000. This concern several months ago obtained a franchise from the St. Louis (Mo.) Board of Public Service to operate bus lines on leading thoroughfares, as related in the September issue of BUS TRANSPORTATION, while the East St. Louis City Council recently granted it similar privileges. On the east side of the Mississippi the most important link is a cross-town line connection between Lansdowne, Winstanley, Alta Sita and the Municipal Bridge.

Orders were recently placed with the Fifth Avenue Coach Company, New York, for the delivery of 140 of the Fifth Avenue type coach by March 1. The coach is an exact duplicate of those in use on Fifth Avenue, New York City. The new buses will accommodate fifty-two passengers, having seats for twenty-two on the lower and for thirty on the upper deck.

Augustus Barnes, who received the operating permit from the Board of Public Service, has been in St. Louis for several weeks taking care of preliminary steps for the opening of operations, which is expected to take place about April 1.

Richard W. Meade, New York City, for thirteen years general manager and president of the Fifth Avenue Coach Company and also for several years head of the Detroit Motor Bus Company, has been selected to fill a similar position with the company.

Three of the proposed routes over which the buses will operate were described in the September issue.

A fourth line will start at Skinner Road and the Washington University. The route will be north to Waterman Avenue, east to Union Boulevard, south to Lindell Boulevard, east to Locust Boulevard and thence east to Twelfth Boulevard, south to Chestnut Street, east to Seventh Street, north to Washington Boulevard, east to Twelfth Boulevard, south to Locust Boulevard and then return over the same route to the point of beginning.

In the evening special theater routes will be maintained for the convenience of patrons of downtown amusement places. This route will be from 7:15 p.m. to 9:15 p.m. as follows: East from eastern city limits of University City on Delmar Boulevard to Newstead Avenue, south to Washington Boulevard, east to Twelfth Boulevard, to Locust Boulevard, east to Sixth Street, south to Market Street, west to Seventh Street and thence to point of beginning along original route.

Between 10 p.m. and midnight buses will operate from Third Street and

Washington Boulevard, west to Sixth Street, south to Market Street, west to Seventh Street, north to Locust Street, west to Fourteenth Street, north to Washington Boulevard, west to Spring Avenue north to Delmar Boulevard and thence west to eastern city limits of University City.

During the Municipal Opera season at the Municipal Theatre in Forest Park and other special occasions at that theatre buses will operate from Delmar Boulevard and DeBalivier Avenue south to Forest Park and thence to the theatre.

The St. Louis permits require that transfer privileges must be extended from the Municipal Theatre and Grand Boulevard lines to any of the East and West lines and vice versa. A maximum fare of 10 cents may be charged.

The ordinance further requires that a license of \$25 for each car must be paid and in addition 3 per cent of the gross receipts must be paid to the city. The buses may not carry more than two passengers in excess of their capacity. The drivers must be in uniform and be numbered for purposes of identification.

At present there is but one privately owned bus operating inside the limits of St. Louis. This is owned by John A. Hoffman, and has a capacity of twelve passengers. He operates from the northern terminus of the Broadway car line in Baden northward along Broadway and the Bellefontaine road to the Bellefontaine Industrial School.

## Railway to Operate Bus Line in Malden

The Boston (Mass.) Elevated Railway has just put into operation its second motor bus line. The new line is operated in Malden, Mass., replacing the former Highland Avenue car line, on which service has been abandoned. The other line operated by this company is in Allston.

This Malden line is being started in conformity with the announced policy of this company to replace non-paying railway lines with motor bus service, whenever the plans of the city authorities require reconstruction of streets and tracks.

This new route operates from Malden Square through Pleasant Street, Highland Avenue, Medford Street, to the Fellsway, and returns via the same route. The round-trip distance is 3.2 miles, and the scheduled running time is twenty minutes. The normal weekday schedule calls for a ten-minute motor bus headway from 6 a.m. to 11:30 p.m.

Equipment for this service consists of four new White Model 50 buses, with 25-seat bodies, built by the Brown Body Company. Three buses will be used in regular service and one will be kept for emergency use. Fares will be the same as in the case of the Allston bus line of this company—5 cents for a single local trip on the motor bus, or 10 cents for a through ride, including transfer.

## Commission Denies Permit to Washington Company

The application of the United Transportation Company to establish a bus line from Fifteenth Street and Maryland Avenue, N. E., to Twenty-first and B Streets, N. W., Washington, D. C., was denied on Dec. 28 by the Public Utilities Commission of the District of Columbia.

The commission held that if there was a demand for service on this route that service should be given in conjunction with the street railway service with transfer privileges between the street cars and buses.

In BUS TRANSPORTATION for November there appears an account of the formation of the United Transportation Company, with W. Elkins Reed as president. The application recently denied by the commission was the first one entered by the company.

## Pacific Railway to Operate Feeder Service in Los Angeles

The Pacific Electric Land Company, a subsidiary of the Pacific Electric Railway Company, has been granted a certificate by the California State Railroad Commission to establish bus service between Long Beach Avenue and 20th Street, Los Angeles, and Baker and Heliotrope Avenues in the Maywood district. The December issue of BUS TRANSPORTATION contained an outline of this project.

Since the opening of the Los Angeles stockyards and the increasing industrial expansion of the Maywood section, there has been an imperative need for transportation service in this district. The new bus line connects with the Pacific Railway lines both in Los Angeles and Maywood and with the Los Angeles Railway at Twenty-Sixth Street and Santa Fe Avenue. Three applications to serve this district, other than that of the Pacific Electric Land Company, were denied by the commission.

## Port Jervis Railway Seeks Bus Franchise

At its November meeting, the Port Jervis (N. Y.) Traction Company made application to the City Council for franchises to operate four buses of the Fifth Avenue type on the streets of Port Jervis in conjunction with the company's railway service. The company's plan is to replace trolley cars on its lateral lines with buses.

Secretary Orin C. Baker of the Newburgh Chamber of Commerce told the meeting of the advantages of bus transportation in the city of Newburgh, which is the pioneer bus center of the Hudson Valley. Mr. Baker's talk gave the bus a clean bill and came very near moving the Port Jervis Council to grant the franchises. On the advice of the City Corporation Counsel, however, the matter was deferred until the next meeting, when it is expected definite action will be taken.





from these claims that the county councils in England have very small powers compared with those of town councils. In rural areas the parish and similar units are still strong.

### Buses Win in Weehawken Dispute

In a recent opinion rendered by Vice-Chancellor Backes, the bus lines which radiate from the West Shore ferry at Weehawken, N. J., have won a victory over the Public Service Railway. This opinion upholds the right of the township of Weehawken to prevent the erection of a fence by the railway, which would exclude the buses from collecting passengers at the ferry. The litigation involved a plaza 60 ft. wide and 120 ft. long in front of the ferry. The Public Service has a right-of-way, granted in 1895 by the West Shore Railroad, to run its cars on part of this area. The cars were formerly run down to the ferry, but about eight years ago a loop was built south of the plaza, where the cars were switched. In the meantime the buses have been using the space for parking. Recently when the Public Service resumed use of the tracks there and sought to fence the tracks the township tore down the fence. The opinion upholds the right of the township to regulate its traffic.

### Murrieta Line Established in 1916

The article which appeared in the December issue of BUS TRANSPORTATION on page 665 under the caption "War Declared Against Southern California 'Wildcat' Lines" is declared by representatives of the Murrieta Mineral Hot Springs Auto Stage Line to be misleading and erroneous in that it conveys the impression that the Murrieta Hot Springs Stage line is one of the "wildcat lines" referred to in the article.

It appears that the litigation instituted by the Motor Transit Company against the Murrieta Mineral Hot Springs Auto Stage line is entirely separate from the action taken by the Motor Transit Company against the "wildcat" operators mentioned in the article. In this connection on behalf of the Murrieta line it is contended that it has the licenses and permission required by law and is fully covered by insurance for the protection of passengers.

In order that the matter may be further clarified we are reprinting a portion of the article referred to which clearly explains the litigation in which the Murrieta line is involved as follows: "In its complaint the Motor Transit Company alleges that the Murrieta line is not operating within its rights in transporting passengers from Fullerton and Anaheim to Los Angeles and in extending its line through Corona, Placentia and Yorba.

"The owner of the Murrieta Stage Line claims the right to carry passengers between Los Angeles and Murrieta Hot Springs by right of a priority grant in 1916."

## Tabular Presentation of Recent Bus Developments

Company	Address	Route
<b>Incorporations</b>		
Frankfort Bus and Truck Line Co.	Frankfort, Ky.	
Union Motor Stage Terminal Co.	Cleveland, Ohio	
Houser Motor Bus Co.	North Liberty, Ind.	
Buckeye Transportation Co.	Hamilton, Ohio	Cincinnati to Dayton, Ohio
Clayton-Quincy Motor Bus Co.	Clayton, Ill.	
Indianapolis-Bloomington Omnibus and Transfer Co.	Indianapolis, Ind.	
<b>Applications Filed</b>		
Leonard Dickinson	Owego, N. Y.	Owego to Binghamton, N. Y.
J. R. Tedrick		Santa Fe Springs, Calif.
Lewis Kessler		Bridgeton to Millville, N. J.
George Zellers	Millville, N. J.	Westwood to Engelwood, N. J.
Vincent De Lalla		Yonkers
W. E. Coleman	82 Ravine Ave., Yonkers, N. Y.	Isleton to Rio Visto, Calif.
M. L. Isham	Rio Vista, Cal.	Mariposa to Grass Valley, Calif.
John Bieber		Delaware Ave. and Bailey Ave.
International Railway Co.	Buffalo, N. Y. (two routes)	Port Seward to Zenia, Calif.
Ernest E. Kniss		Jamestown (south side)
Ralph Robinson	Jamestown, N. Y.	Middletown to Durham, Conn.
L. A. Bristol	Durham, Conn.	Ambleton to Norristown, Pa.
Charles Gulden & Son	Ambleton, Pa.	Middletown to Guilford, Conn.
Connecticut Motor Transport Co.	New London, Conn.	Erie to West Springfield, Pa.
William Miller	Erie, Pa.	Santa Monica to Los Flores, Calif.
E. J. Kleinsmith		
Erie County Bus Lines	Erie, Pa.	
C. P. Koelliker	425 E. 24th St., Paterson, N. J.	Paterson, N. J.
D. P. Ihoney	Niagara Falls, N. Y.	
L. A. Gillett		Colusa to Grimes, Calif.
East Peoria Motor Bus Co.		Peoria, Ill.
J. R. Engel		Uniontown, Pa., to Wheeling, W. Va.
John Twigg		Susanville to Klamath Falls, Calif.
Smith & Ramsay		Weaverville to Peanut, Calif.
J. B. Enos		
<b>Permits Granted</b>		
L. V. & F. Giambastiani		Inverness to Point Reyes, Calif.
Robert Albritton	Centralia, Wash.	Tono to Centralia, Wash.
John Carney	Elizabeth, N. J.	Linden to Borlant Park, N. J.
W. V. Butler		Cottonwood to Red Bluff, Calif.
Walter Yager		Meadow Valley to Quincy, Calif.
Bassham & Brown		French Gulch to Carville, Calif.
F. B. Lester	Walkill, N. Y.	Newburgh to Walkill, N. Y.
Langston Transportation Co.		Witmer to Ephrata, Pa.
H. W. Geer & Sons		Thompsons to Sego, Utah
Conestoga Transportation Co.		Long Park to Lancaster, Pa.
Axel Falkenstrom	186 Brighton Ave., Perth Amboy, N. J.	Metuchen to Plainfield, N. J.
A. J. MacIntyre	Billings, Mont.	Aberdeen, S. D.
Warren W. Putnam	Buffalo, N. Y.	Lockport, N. Y.
Roswell Weinrich	Selinsgrove, Pa.	Sunbury to Selinsgrove, Pa.
Tony Yavonne		Catskill to Leeds, N. Y.
Gem City Motor Bus Co.	Peoria, Ill.	Quincy to Mt. Sterling, Ill.
A. B. Fletcher Motor Co.	Hannibal, Mo.	Hannibal to Quincy, Ill.
G. E. Schrack Co.	Tulsa, Okla.	
Claude Walter	Freeburg, Pa.	Freeburg to Sunbury, Pa.
Yellow Line Bus Co.	Oil City, Pa.	Clarion to Oil City, Pa.
<b>Applications Denied</b>		
John P. Lund and H. Schon	Wilmington, Del.	Chester, Pa., to Wilmington, Del.
<b>Lines Started</b>		
Terre Haute-Linton Bus Co.	Terre Haute, Ind.	Via Coalmont
Pebbles Corner Bus Co.	Cincinnati, Ohio	Cincinnati, Ohio
White Transportation Co.	Huntington, W. Va.	Huntington to Charleston, W. Va.
Waller and Edmonson Motor Co.		Oakwood to Clarksville, Tenn.
False River Line		Port Allen to New Roads, La.
R. M. Barrow	Beaumont, Miss.	Hattiesburg to Avery, Miss.
St. Joseph-Archison Short Line Co.	St. Joseph, Mo.	St. Joseph to Archison, Kansas
Charles H. Van Riper		Kansas City to Harrisonville, Mo.
L. Derrenberger		Orrville to Wooster, Ohio
Dayton, Hamilton & Cincinnati Rapid Transit Co.		Cincinnati to Oakley, Ky.
Cincinnati Motor Bus Transit Co.	Hamilton, Ohio	Cincinnati to Norwood, Ohio
M. Wilson	Newark, N. J.	New Brunswick to Somerville
Northern Motor Bus Syndicate Co.	Minneapolis, Minn.	Minneapolis to St. Cloud, Minn.
C. F. Crews		Willows to Groville, Calif.
Sherwood Motor Co.	Cushing, Okla.	Cushing to Bristow, Okla.
Mississippi Transportation Co.	Vicksburg, Miss.	Vicksburg to Jackson, Miss.
Keller & Harding		Teledo to Findlay, Ohio
John Tibbett	Kingman, Ind.	Kingman to Cayuga, Ind.
Bunkelman & Son	Seymour, Wis.	Green Bay to Manitowoc, Wis.
Owen Pratt	Mechanicsburg, Ohio	Mechanicsburg to Springfield
J. H. Barnard	Fayette, La.	Fayette to Columbus, La.
Appleton Transportation Co.	Appleton, Wis.	Appleton to Kaukauna, Wis.
Colorado Motor Way, Inc.	Denver, Colo.	Denver to Greeley
		Denver to Canon City
		Denver to Colorado Springs
<b>Proposed Lines</b>		
Richmond Rapid Transit Corp.	Richmond, Va.	Richmond, Va.
Boulevard Transit Co.	Omaha, Neb.	Sioux City, to Lawton, Iowa
T. H. Dwight	Middletown, N. Y.	Middletown, to Chester, N. Y.
G. W. Layne	Crawfordsville, Ind.	Decatur to Pana, Ill.
Red Star Bus Co.		Marietta to Cambridge, Ohio
Chicago & Joliet Transportation Co.		Lockport to Stateville, Ill.
Illinois Motor Bus Line Co.		West Frankfort to Herrin, Ill.
		West Frankfort to Du Quoin, Ill.
Mississippi Transportation Co.	Vicksburg, Miss.	Jackson to McComb, Miss.
Boulevard Transit Co.	Omaha, Neb.	Jackson to Canton, Miss.
White Transportation Co.		Sioux City to Correctionville, Ia.
		Sioux City to Moline, Ia.
		Omaha to Lincoln, Neb.
<b>Changes in Ownership</b>		
J. A. Gray to Marcus J. Pete		Palm Springs to Whitewater, Calif.
G & W Stage Co. to Motor Transit Co.		Los Angeles to Gilmans, Hot Springs, Calif.
W. R. Miles to Crabb, Morgan & Crabb		Fresno to Del Ray, Calif.



## Richmond Corporation Granted Franchise

### Ordinance Passed Providing for Two Bus Routes in Residential Section— Result of Long Campaign.

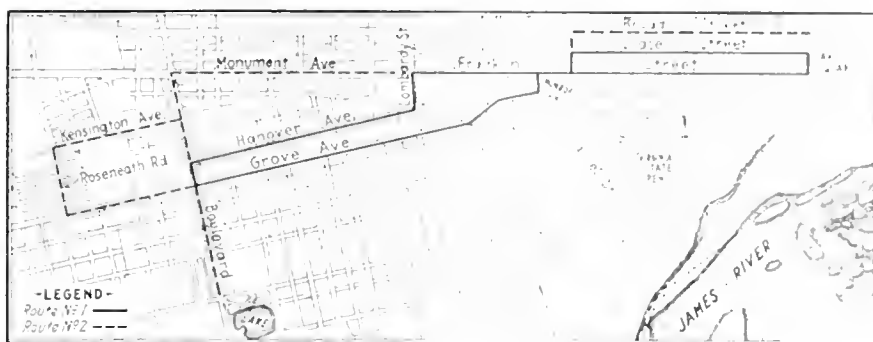
AS a result of the industrial development and consequent increase in population of Richmond, Va., within the last few years the residential districts grew so rapidly that the transportation service could not keep pace with its expansion. Residents of the outlying districts were obliged in some instances to walk long distances to the nearest street railway line, in spite of the fact that the railway service was extended in an effort to meet the needs of the public.

Ford touring cars and other small private automobiles attempted to fill the

The arrangement was finally made with the city for the passage of a ordinance granting a bus franchise to the right holder.

The Richmond Rapid Transit Corporation was then formed and incorporated under the laws of the State of Virginia, and for the year of 1914 was granted the franchise to operate upon the streets of Richmond. The provisions of the ordinance granting the permit include the payment of a 1 per cent gross receipt tax to the city by the corporation. The ordinance designates the routes over which the line will operate, as shown in the accompanying map of the city. The fare is fixed at 8 cents or four tickets for 30 cents.

The two routes of the Richmond Rapid Transit Corporation do not serve the territory already covered by the



*Proposed routes of the Richmond Rapid Transit Corporation*

breach, but the service afforded was uncertain and was not looked upon with favor by the general public. Finally these buses were barred from the residential section and obliged to confine their operations almost wholly to the business section. This left a great area of the city virtually without transportation facilities.

The chief credit for solving this traffic problem belongs to Gilbert K. Pollock, a well-known attorney and lifelong resident of Richmond. Early in 1922 Mr. Pollock began to feel the public pulse in regard to the establishment of a properly equipped and unified bus transportation system. At first the scheme met with general apathy and with some active opposition. This undercurrent of feeling, which was due probably in a large measure to the unsuccessful jitney experience referred to, Mr. Pollock undertook to overcome by a strenuous publicity campaign. Full-page advertisements were inserted in the newspapers pointing out the benefits of bus transportation and appealing for public support in securing a franchise from the City Council. Associated with Mr. Pollock in this movement were W. H. Warren and H. V. Godbold.

Owing to the fact that neither the state nor municipality had any statutes governing the operation of buses there were many legal obstacles to overcome. It was only after a long campaign that

existing street railway lines, on which the fare is 6 cents.

The ordinance also stipulates that the company must take out indemnity insurance to the extent of at least \$10,000 per vehicle or deposit bonds, the cash value of which shall not at any time be less than \$50,000. The corporation is also required to file \$10,000 in bonds insuring the establishment of the proposed service within ninety days.

Orders have been placed for sixteen buses of twenty-five passenger capacity for Route 1, which is 6 miles in its round-trip length. For Route No. 2 ten seventeen-passenger buses have been purchased. This route is 7 miles long, including round trip.

The officers of the corporation are: President, W. H. Warren; vice-president, Gilbert K. Pollock; secretary, J. C. Moon; treasurer, O. J. Sands; general counsel, L. C. Williams.

J. A. Baird of Hopewell, Va., for many years identified with electric railway transportation, is the general manager and Eugene H. Meyer is the consulting engineer of the company.

**Railway Creates Subsidiary Company to Run Buses.**—The Chicago & Joliet Transportation Company, a subsidiary of the Chicago & Joliet Electric Railway, has been formed for the purpose of operating buses in connection with the railway service of the parent company. Application has been made to

the House of Representatives for  
the purpose of the bill, and  
to be known as the "National  
Archives Act."

## Increased Memphis Operations Cause Demand for Terminal

The chief of the tribe, however, was to be made a member of the Menominee Territory, and the proposed permanent meeting of the company. The rate of the first Railroad freight depot on First Street, to be considered a public utility, to be owned and operated by the State, and the building a municipal terminal, and I know of nothing of greater interest alike to the business interest of Menominee and the people of the adjoining territory than to establish it. But if they are to be a part of it, they should be some extra part to them, with a view to their own benefit.

## Another Company Applies for Philadelphia Franchise

It is noted, on the other hand, that the Pennsylvania Railroad Transportation Company has not, in its annual report for 1906, contributed to the BUREAU OF TRANSPORTATION, as an appropriate recognition of the city by the Key Stone Transportation Company.

The original proposal, made by the new company, provided for an 8-cent fare from City Hall to the Boulevard, exchanging northwardly on Broad Street and eastwardly on the Boulevard, as well as east and west on Diamond Street, for a 5-cent extra charge. The original plan also contained an offer to pay the city 5 per cent of the gross earnings of the line, the aim to be in no case less than \$10,000. These conditions were amended in a later and revised offer in which the Keystone company offered to pay a 5 per cent gross earnings tax with a guarantee of \$7,500, and to reduce the fare on the Boulevard to four tickets for 25 cents.

Identified with the latest applications are the following Philadelphia: Edwin A. Lee, Bart Tyson, William Lloyd and H. M. Lee. The proposed routes do not in any case parallel existing street car lines.

Both applications are in the hands of the Council and the whole matter is in abeyance awaiting action by the city. Proposals of the two companies will be considered simultaneously, it is believed. The Philadelphia Rapid Transit Company identified its own Philadelphia Rapid Transit route as proposing to operate two lines of transportation with the use of trolleys. The P. R. T. proposed fare on the Berksville route is 10 cents and on the Germantown line 7 cents, with a one-cent additional charge for transfer.

### Jail Sentence for Originator of Coupon-Bus Plan

Previous issues of BUS TRANSPORTATION have described the novel scheme of Charles Bright, the Brooklyn, N. Y., newspaper publisher, who operated buses in connection with his newspaper enterprise and granted transportation to all holders of coupons clipped from his newspaper. The ambitious plans of Mr. Bright met with a severe setback on Dec. 13 in Supreme Court in Brooklyn when he was sentenced to serve fifteen days in jail and pay a fine of \$250.

The sentence was the result of the operation of buses by Mr. Bright after such operation had been enjoined by the Supreme Court, acting on the complaint of the Nassau Electric Railway, which claimed the bus line activities of Mr. Bright and other operators constituted illegal and unfair competition.

### Washington Railways Win Bus Line Grant

The Public Utilities Commission of the District of Columbia has granted the application of the Washington Railway & Electric Company to operate buses between Connecticut and Wisconsin Avenues via Woodley Road, in conjunction with the Capital Traction Company. The project was outlined in considerable detail in the December issue of BUS TRANSPORTATION.

The fare on the new line will be 8 cents or six tokens for 40 cents. Tokens will be accepted on all street railway lines. Transfers between the bus lines and connecting lines of the two railways will be issued at 2 cents each, provided that when a second transfer is required for a continuous ride it shall be issued without charge.

Answering the argument of Conrad H. Syme, who appeared in opposition as the representative of the Washington Rapid Transit Company, the commission stated that there was no doubt of the power of the commission to issue a bus line permit to a railway.

### Winter Bus Service Vindicated in Colorado

The Colorado Public Utilities Commission has granted to W. E. Carver a certificate of convenience and necessity to operate a motor bus line between Denver and Steamboat Springs. In granting the certificate the commissioners ordered that monthly reports be submitted to it showing the number of days the bus service was operated during the preceding month. The application was contested by the Denver & Salt Lake Railroad, which claimed that there was not enough traffic for both bus and rail lines; that the bus service could be maintained only during the best of weather, not at all during the heavy snow season, and that, inasmuch as the railroad must operate every day, Mr. Carver's operation would further reduce the railroad's small revenue.

The proposed route of the bus line would be in competition with the railroad only between Fraser and Kremling, and as snow blockades, landslides and other impediments have been the cause of uncertain service by the railroad, bus transportation was decided by the commission to be a necessity. It was brought out that Mr. Carver's buses moved the traffic last year when the railroad was blockaded by a tunnel cave-in.

### Pasadena Votes Down City Bus System

At the special election held on Dec. 5 at Pasadena, Calif., the proposition of bonding the city for \$500,000 for the purpose of financing a municipal motor bus system was defeated by a decisive majority. (See page 664 of the December issue of BUS TRANSPORTATION for a detailed account of the situation.) The proposition failed by 800 votes to secure the necessary two-thirds majority. The vote was Yes, 5,555; No, 3,930.

The result of the election automatically completes the contract made by the Pacific Electric Railway and the Pasadena motor bus owners, by which the railway, which operates the local street car lines, takes over and operates all the motor bus lines in the city, with the single exception of the buses of one North Wolson Avenue operator, who refused to sell out to the railway.

The president of the Chamber of Commerce asserts that the defeat of the municipal bus proposition is still a victory; that in an effort to bring about satisfactory transportation in Pasadena, the Chamber of Commerce will be ready to aid both the Pacific Electric Railway and the city directors.

The Federated Improvement Association, in presenting a set of resolutions to the Board of Directors commenting on the election, claims that the issue would have carried had the fully registered vote been cast. The resolution also urges that the Board of Directors call another election for voting bonds for a municipal bus system at the earliest date allowed by law.

D. W. Pontius, vice-president and general manager of the Pacific Electric Railway, in commenting on the results of the election, said in part:

"As I have previously stated, the railway company stands ready to carry out its promises, which are to rehabilitate the tracks, increase the service and establish auxiliary bus lines, so that the city of Pasadena will be adequately served with transportation, and I feel that beyond question the Board of Directors will now give the railway company an opportunity to do this, and, in the end, Pasadena as a whole will be satisfied with the Pacific Electric local service."

The question as to whether the permits of the independent bus operators can be transferred to the Pacific Electric Railway has not been decided.

### Jamestown Railway Gives Buses a Trial

The Jamestown (N. Y.) Street Railway has been asked by the City Council to operate trial motor bus lines in various sections of the city as an experiment with a view to the future installation of several feeder bus lines by the railway. This proposal came about through the application of Ralph H. Robinson, who sought permission from the Council to operate a bus line on the south side. The railway did not object to the route as originally planned and even offered to exchange transfers. When the routes of the proposed line were later amended so that the railway tracks were paralleled on various streets the railway protested.

The Council held that a united bus and railway transportation system was preferable to several competitive units.

### Buses Now a Part of Toledo Railway System

The Community Traction Company, Toledo, Ohio, has been authorized by the City Council to issue \$30,000 of preferred stock for the purchase of four motor buses, which will be placed in immediate service as an extension to the Oak Street railway line.

If this extension to railway service proves satisfactory it is expected other bus extensions will be established.

The new line will serve a community of railroad men and several railroads plan to co-operate by taking off labor trains, which have in the past transported their employees to and from work. The service will be under the control of the City Council, which has planned for the erection of a \$10,000 garage for housing the buses in the rear of the Starr Avenue carhouse. Twenty-five passenger Garford buses will be used, according to Street Railway Commissioner Cann.

### Jersey Commission Decides in Favor of Established Lines

What is regarded as an official outline of the policy to be pursued by the New Jersey Board of Public Utility Commissioners in respect to future applications for the establishment of new bus routes in competition with established lines, was handed down by the board in approving the recent application of Boro Buses, Inc., to augment its service between Red Bank and Sea Bright, N. J., by the addition of another motor bus.

At the same time the Board denied another application which asked permission to establish a new line which could cover a portion of the route now served by the Boro Buses. In denying this application the opinion of the board was "that more efficient and economical service could be rendered by a unified system of operation and that to allow unnecessary competition on a route on which safe and adequate service is being given would result in poor service to the public."



## Financial Section

### Comment on California Returns

State Commission Explains Some of the Difficulties Encountered in Obtaining Operating Data

**D**URING the latter part of the year 1921 the Railroad Commission of California issued a classification account for automotive transportation companies, known as Class A; that is, such companies as showed a gross revenue of \$20,000 or more during the calendar year.

In its forthcoming report for the year ended June 30, 1922, the commission explains that a considerable number of these companies which show a reasonable profit on their annual statements do not actually earn anywhere near the amount shown, as in a number of instances the owner of the line drives a machine himself and makes no charge for his services. He fails to charge any amount whatsoever for depreciation or numerous other items chargeable to operating costs. Other companies which show a deficit in their reports charge to operating costs the purchase price of new equipment acquired during the year, which is not a proper operating charge, and which, if deducted, would show that in reality the line earned a profit instead of being operated at a loss. Of the larger companies reporting to the commission very few show even a reasonable return upon the capital invested.

The B & H Transportation Company, operating a bus street car service in the city of Long Beach, shows a net revenue of \$7,563. This company has an investment in equipment amounting to \$139,592, with additional investment in buildings, materials, supplies and land owned totaling in excess of \$200,000, from which it would appear that it is receiving only about 1 per cent return upon its investment. The Crown Stage Line, operating between Los Angeles and Santa Ana, shows a net revenue of \$19,849, with about half the investment of the B & H Transportation Company.

The Motor Transit Company of Los Angeles, the largest passenger stage line in the state, reports a gross revenue of \$1,568,132 and operating expenses of \$1,618,893, or a deficit of \$50,759.

The California Transit Company, the second largest passenger stage line, reports a gross revenue of \$834,295 and operating expenses amounting to \$827,726, or a net revenue of \$6,568. The investment in this case is approximately \$700,000, which makes the return less than 1 per cent.

The Pickwick Stages, Northern Division, Inc., operating between Los Angeles, San Francisco and Portland, reports gross revenue of \$338,847 and

total operating expense of \$360,000, or a net revenue of \$8,847 on an investment of approximately \$200,000, or a little in excess of 4 per cent.

From the reports submitted for the year ended Dec. 31, 1921, it would appear that few, if any, of the automobile truck lines earned even a reasonable return upon the capital invested. The automobile passenger stage line operating to Yosemite National Park, Mariposa Big Trees and Lake Tahoe districts all show substantial earnings, while the passenger stage lines operating in the outfield districts of Kern County show a considerable falling off in revenue for the year 1921 as compared with the year 1920. This was undoubtedly due to labor conditions in the outfield during the year covered by the report.

The commission explains that without a uniform classification of costs it is extremely difficult to analyze the reports submitted by the great majority of stage lines, particularly the numerous

small ones. It is pointed out that the commission has endeavored to obtain uniformity in the reports by the issuance of a circular letter to all companies reporting, and by the appointment of a committee to study the reports and make suggestions for improvement. It is also pointed out that the commission has endeavored to obtain uniformity in the reports by the issuance of a circular letter to all companies reporting, and by the appointment of a committee to study the reports and make suggestions for improvement.

### Cost of Bus Operation in Akron

The following table shows the cost of bus operation in Akron for the year ended June 30, 1922. The table is divided into two parts, one showing the cost of operation per mile and the other showing the cost of operation per passenger mile.

#### Analysis of Cost of Operations in Akron

Analysis of Cost of Operations in Akron									
For the year ended June 30, 1922									
Per mile									
Operating revenue	\$17,663.25	25.24	\$2,000.00	2.84					
Operating expenses									
I. Conducting transportation									
Superintendence	\$442.00	0.68	\$1,000.00	1.41					
Wages of drivers	16,198.66	24.60	1,000.00	1.41					
Tires and oil	179.00	0.28	1,000.00	1.41					
Garage and shop, per cent									
Cleaning and washing of	1,226.00	1.84	1,000.00	1.41					
Garage and shop rent	92.00	0.14	1,000.00	1.41					
Garage and shop supplies and expenses	120.00	0.18	1,000.00	1.41					
Total	\$20,000.00	30.44							
II. Power									
Fuel	13,121.00	19.84	1,000.00	1.41					
Lubricants	663.00	1.00	1,000.00	1.41					
Total power	\$13,784.00	20.84							
III. Maintenance									
Vehicles—Chassis	\$7,876.00	11.84	1,000.00	1.41					
Bodies	1,990.00	3.00	1,000.00	1.41					
Tires	1,428.00	2.16	1,000.00	1.41					
Garage and shop rent	87.00	0.13	1,000.00	1.41					
Buildings and structures									
Total maintenance	\$12,381.00	18.54							
IV. Advertising	\$278.00	0.42							
V. General and miscellaneous									
Salaries of expenses, general	334.00	0.51							
Office	46.00	0.07							
General	24,000.00	36.00							
Expenses	10,000.00	15.00							
Miscellaneous	1,234.00	1.85							
Injuries and damages	4,700.00	7.04							
Interest on investments	4,700.00	7.04							
Total general and miscellaneous	\$27,700.00	41.84							
Total operating expenses	\$52,784.00	79.18							
Net revenue	\$17,663.25	25.24							
Total	\$70,447.25	104.42							
Per passenger mile									
Operating revenue	\$17,663.25	25.24							
Operating expenses	\$52,784.00	79.18							
Total	\$70,447.25	104.42							
Net revenue	\$17,663.25	25.24							
Total	\$70,447.25	104.42							

Notes: Figures are determined on basis of gross revenue and operating expenses, and are not adjusted for depreciation on basis of gross revenue and operating expenses.

& Light Company commenced March 19 on the Maple-West Exchange Street Exchange Street route. On Aug. 7 two other lines were started, namely, the Arlington extension and the crosstown line. On Aug. 22 the North Howard Street extension was opened. In October three more routes were put into service, namely, the South Maple Street Viaduct and Fairlawn routes on Oct. 5, 13 and 18 respectively. All told more than 10 miles of routes are now served exclusively by the bus. The fare on each route is 5 cents with free transfers to and from the trolley car routes.

At present only one line is really paying, that is the Maple-West Exchange Street route. This line reaches the downtown district, as do the Viaduct and South Maple Street routes, which also give evidence of soon becoming paying lines. It is also probable that the North Howard Street route will in time become a paying proposition.

The Crosstown line, the West Market Street extension and the Arlington extension show losses, particularly the crosstown line, where the transfer business is exceptionally heavy. In fact, all the feeders fail to earn the cost of service.

In October 504,620 passengers were carried by the buses, of which 121,801 were transfer passengers. To do this 84,547 miles were run in 9,482 hours. Gross earnings amounted to 24.06 cents per mile compared to 21.76 cents, exclusive of depreciation, for operating expenses. The item of depreciation amounted to 3.585 cents per mile.

### New Buckeye Company to Issue Stock

The Buckeye Transportation Company, Hamilton, Ohio, proposing to operate a bus line between Cincinnati and Dayton, has asked the State Public Utilities Commission for authority to purchase the assets of the unincorporated company by the same name, now carrying on the business, and also made application to issue \$20,000 in stock to take over the present equity of the owners. The new company assumes obligations of \$57,908. The old company's assets were given as \$77,936.

### Bus Lines Important Factor in Wisconsin Railway System

Among the railways of this country, which have supplemented their electric service with motor bus lines, the Milwaukee (Wis.) Electric Railway & Light Company is accorded a place in the front rank.

An idea of the extensive part played by the bus in the Milwaukee company's traffic system may be derived from the fact that during the first nine months of the present year, their buses transported more than 1,100,000 passengers and operated a total of 910,554 miles.

On Sept. 30, 1922, this company had in service a total of seventy buses, eleven of which operate within the city

of Milwaukee; four are leased to the Wisconsin Gas & Electric Company for service in Kenosha, and the remainder are engaged in interurban traffic. During the past year, the interests of the principal competitors have been absorbed and substantially all of the motor bus operations in the Milwaukee district are carried on by this company.

The combined motor and electric systems total 814 miles, of which 600 miles are traversed by the buses.

The bus lines extend to Fond du Lac on the north, to Madison on the west and to Janesville, Beloit and Lake Geneva on the southwest. Co-ordinating with these motor lines is the electric system extending to Sheboygan on the north, to Racine and Kenosha on the south, to Watertown on the west and East Troy and Burlington on the southwest.

### Fifth Avenue Company's \$4,000,000 Offer Accepted

The offer of the Fifth Avenue Bus Securities Corporation, New York City, to purchase for \$4,000,000 the stock of the New York Transportation Company, amounting to 103,574 shares, held as assets of the bankrupt Interborough Consolidated Corporation, has been accepted by J. R. Sheffield, trustee in bankruptcy of the Interborough corporation. The original offer was \$31.50 per share or \$3,262,581 and was raised to the accepted figure at the suggestion of Judge Mayer of the Federal District Court with the approval of 97 per cent of the bondholders.

The Fifth Avenue Bus Securities Corporation is a successor to the Fifth Avenue Bus Corporation, the formation of which was discussed in some detail in the December issue.

### Detroit Company Pays Dividends

The Detroit Motor Bus Company, Detroit, Mich., on Dec. 10 paid a 25 per cent stock dividend to stockholders of record as of Nov. 28. The directors of the company have also declared the regular quarterly cash dividend of 2 per cent and an extra cash dividend of 1 per cent, payable on Jan. 15, 1923, to stockholders of record as of Dec. 30.

**Railway Centers Bus Interests in Subsidiary.**—The Pacific Electric Railway plans to center all its bus service under the control of the Pacific Electric Land Company, a subsidiary corporation, and has applied to the California State Railroad Commission for authority to transfer various lines to the land company.

**Pickwick Stages Offers \$100,000 for Line.**—The Pickwick Stages, Inc., which has recently acquired several California motor bus lines, will add to its system the Santa Ana-Los Angeles route if the State Railroad Commission approves the proposed sale of this line by the Crown Auto Stage Company to the Pickwick interests for \$100,000. It is estimated that this line carries more than 400,000 passengers yearly.

**West Virginia Company Increases Capital Stock.**—The White Transportation Company, which has operated a bus line between Huntington and Milton, W. Va., for the past four years, has increased its capital stock from \$50,000 common stock to \$100,000, of which \$50,000 will be common stock and \$50,000 8 per cent preferred. This increase will enable the company to make the necessary purchases of new equipment and extension of bus service from Huntington to Charleston as soon as the highway now under construction is completed.



### Motor Vehicle Transportation

By Henry C. Spurr. Published by Public Utility Reports, Inc., Rochester, N. Y. 696 pages, 6 x 9 in., indexed; cloth.

The law of motor vehicle common carriers, as it has been put into practice by the state public service commissions throughout the country, is expounded in this book. There are three chapters, the first taking up the contemporary development of the automobile in connection with the existing theory of public supervision; the second is a classified review of the general rules, regulations and legislation governing rates, operation and service; while the third chapter, which makes up nearly three-quarters of the whole book, consists of state commission rulings, policies and regulations as applied in actual controversies, all arranged alphabetically according to states.

The law regulating the use of buses, trucks and other motor vehicles used as common carriers, is constantly being amplified by new statutes and by new decisions of the commissions. Many of the basic policies governing the regulation of these public utilities have already been settled, however, and these are given in great detail in the book.

The third chapter is much the longest, but the other two are packed with valuable information. It is unfortunate that a simpler method of cross-references from the second to the third chapter was not used. The review in the second chapter contains a large number of footnotes, referring to sources, but in order to use them it is necessary to consult a list at the back of the book and even then it may be necessary to refer to two or three places in the third chapter before one can find the case or decision wanted. This does not in the end interfere greatly with the value of the book, although it makes it harder to use.

Anyone interested in a broad view of the method followed in regulating motor vehicle common carriers will do well to secure a copy of this book. It covers thoroughly the practice in the various states, and also throws side lights on what is being done in some of the cities.

# Bus Regulation



## Colorado Bus Lines Declared Subject to State Commission

The Public Utilities Commission of the state of Colorado in a recent decision declared that bus lines, operating on regular schedules in competition with railways, are public utilities, subject to the regulation of the commission, and they therefore must take out certificates of necessity and convenience before they may operate in the state.

This rule was laid down in the case brought by the Santa Fe and the Denver & Rio Grande Western Railroads against the Inter-City Automobile Lines, Inc., operating between Denver and Colorado Springs, Pueblo and Canon City, in which the railroads charged that inasmuch as the bus line operates in competition with them, it should be subject to regulation by the Utilities Commission.

To this complaint the Inter-City company filed a demurrer, attacking the jurisdiction of the Utilities Commission on the grounds that the bus line is not a public utility and therefore not subject to that body's regulation.

In pleading their cases before the commission, attorneys for both sides confined their arguments to the public utilities law and overlooked a law passed in 1915, three days after the utilities law, which expressly states that automobile lines operating in competition with railroads are public utilities and therefore subject to state regulation. As a matter of formality another hearing will be held by the commission, at which time the case will be heard on its merits as to whether the operations of the bus lines are in competition with the railroads or not.

## New York Commission Rules on Priority Rights

The New York State Public Service Commission, in denying the application of Hibbard & Frost for a certificate of convenience and necessity to operate a bus line between Windsor and Binghamton, N. Y., held that the operation of a line prior to the enactment of present laws does not give the owners any legal standing unless the provisions of the existing regulations were obeyed.

The applicants based their right to operate upon the fact that they had acquired by purchase a line operated prior to the enactment of the law requiring local consents and state certificates.

M. E. Atkinson, operating a line paralleling the route of the applicants and holding a certificate of convenience and necessity, appeared in opposition to the application. The commissioner held that Mr. Atkinson's operations were legal and valid, and that traffic

between the point de part of the operation was not affected by the fact that the operator of the line had acquired it by purchase. The opinion further stated that failure to comply with the law constituted unlawful operation of the operation in violation of the law, and that the applicant was liable for the same.

## Revision of California Motor Vehicle Laws Proposed

On Dec. 20 Governor-elect F. W. Richardson of California called a conference at San Francisco in anticipation of the demand which it had been stated would be made for an amendment to the state's motor vehicle law.

As soon as the session had opened Mr. Richardson declared that it was his duty to draft amendments to the state vehicle act, which would assure adequate maintenance and reconstruction of the present roads of the state as needed. He declared the meeting was non-political. A gasoline tax of 1 cent per gallon and drastic revision of the state motor vehicle act in order to place a heavier tax on trucks and motor stage buses were approved at the conference by automobile men, highway experts and public officials. Other revisions were: Registration fees based on car weight instead of horsepower; motor vehicle fees to be devoted solely to reconstruction and maintenance of roads; motor vehicles operated for hire to be placed under the jurisdiction of the railroad commission and taxed a percentage of their gross receipts; light passenger vehicles to pay no more than at present and possibly less; a reduction in the gross weight limit of vehicles and loads from 30,000 to 22,000 lb. on state highways, with no reference to county highways.

The conference appointed an executive committee to meet in Los Angeles on Dec. 27 and 28 to draft the approved measures into proposed amendments to the vehicle act to be submitted to a general conference to be held in Los Angeles on Jan. 2.

The conference was attended by representatives of the California State Automobile Association, the Automobile Club of Southern California, the Farm Bureau Federation, the State Association of Peace Officers and the State Association of Supervisors, together with others officials and prominent citizens.

## Jersey Operators May Transfer Permits

The New Jersey Public Utility Commission has handed down a decision permitting bus owners to sell or transfer their permits to others with the approval of the Board of Public Works, even if the buses run mainly on the electric railway. The decision was handed down in the case of two permits of Paterson, who purchased the buses from former owner, The Paterson Service Railway a public utility.

The commission held that the public utility character of the buses was not affected by the fact that they were operated on the electric railway.

## Akron Ordinance Discourages Part-Time Operators

The city of Akron, Ohio, has passed an ordinance which discourages part-time operators of motor vehicles. The ordinance provides that any person who operates a motor vehicle for hire for less than a certain number of hours per week shall be considered a part-time operator and shall be subject to a fine.

The ordinance was passed by the city council on Dec. 19. It provides that any person who operates a motor vehicle for hire for less than a certain number of hours per week shall be considered a part-time operator and shall be subject to a fine. The ordinance also provides that any person who operates a motor vehicle for hire for more than a certain number of hours per week shall be considered a full-time operator and shall be subject to a different set of regulations. The ordinance is intended to encourage full-time operators and to discourage part-time operators who may be less reliable.

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The ordinance provides for a fine which bus owners may incur in case of violation.

The first method is through an indemnity bond either by individual or by an indemnity company.

The second is through liability insurance. The third through the presentation of evidence that the owner is the holder of property the value of which is at least 150 per cent of the maximum insurance required on the type of vehicle, and the fourth, which is an innovation, is through participation in an indemnity fund provided by bus operators.

The fourth method is made possible through the payment of \$5 a quarter for all vehicles in Class A; \$50 a quarter for vehicles in Class B and \$10 a quarter for those in Class C.

The fund will be placed in the hands of a trustee, and will be used for the purpose of indemnifying the public in case of an accident involving a motor vehicle operated by a part-time operator.

The fund will be managed by a committee of bus operators, and will be used for the purpose of indemnifying the public in case of an accident involving a motor vehicle operated by a part-time operator.

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# Personal Notes

## Ralph W. Sanborn of Cleveland

**Prominent Attorney Identified With Many Bus Organizations—Pioneer in the Industry—Active in Ohio Legislation.**

**R**ALPH W. SANBORN, a prominent attorney of Cleveland, Ohio, is one of a group of men who are taking an exceptionally active interest in the establishment and operation of bus transportation lines. He is a member of the law firm of Sanborn, Rieh & McConnell, with offices in the Hippodrome Building. Some time ago he served as municipal judge in East Cleveland, one of the large suburbs of Cleveland. Mr. San-



*Ralph W. Sanborn*

born has always been active in civic matters and has gained the confidence of the public through his work in various directions.

Mr. Sanborn is secretary and treasurer of the Cleveland-Akron Bus Company, one of the first interurban bus transportation companies organized in Ohio. He is also secretary of the Union Motor Stage Terminal Company which is now engaged in the erection of a \$200,000 union terminal building in Cleveland. In addition to holding these offices, he is a director in the Florida Motor Transportation Company, Miami, Fla., and the Red Bus Line, Asheville, N. C.

As an attorney deeply interested in the bus transportation business he has naturally taken a prominent place in associations that have been organized by and for the benefit of those engaged in the business. He is president of the Northern Ohio Motor Stage Owners' Association and member of the board of governors and chairman of the pub-

licity committee of the Ohio Motor Bus Association. Similar connections have been made by him with other organizations devoted to the bus industry.

Mr. Sanborn has had considerable experience in legislative matters in connection with the bus business, as well as other lines, and this has led to prominent connection with organizations which are interested in commercial hauling. He is chairman of the legislative committee of the National Association of Commercial Haulers and chairman of the legislative committee and general counsel of the Ohio Association of Commercial Haulers.

He is very sanguine in the belief that bus transportation has a great future. So far as it has been developed, the results have been such as to warrant great faith in the possibilities that may be reached, and Mr. Sanborn's interests, now covering a wide territory, are gradually growing more and more extensive.

## Prominent Financier Heads Fifth Avenue Corporation

Grayson M.-P. Murphy, president of the newly incorporated Fifth Avenue Bus Securities Corporation, the formation of which was discussed in the December issue of BUS TRANSPORTATION, for more than a decade has been a prominent figure in New York financial circles.

Although Mr. Murphy's financial interests are extensive and varied, it is not alone in the realm of finance that he has achieved distinction. As commissioner for Europe of the American Red Cross Society in France in 1917 and later as a lieutenant-colonel in charge of operations of the general staff, 42nd Division, A. E. F., he established an international reputation as an administrator and military leader.

Mr. Murphy was instrumental in the organization of the Fifth Avenue Bus Corporation in his capacity of chairman of the protective committee of the Interborough-Metropolitan bondholders.

## Mr. Snead Becomes Manager of Oregon Terminal

J. L. S. Snead, Portland, Ore., is the new manager of the Oregon Auto Stage Terminal Company, succeeding P. T. Randall, resigned. Mr. Snead has been an active figure in motor transportation work in Oregon for several years. He is at present secretary of the terminal company, as well as president of the Irvington Garage & Auto Company and owner of the Reliance-Mount Hood stages.

The Portland stage depot was opened on Dec. 15, 1921. The daily passenger turnover approximates 1,000 people over the fifteen lines operating from the terminal.

## R. S. Dimmick Minnesota Head

**Mr. Dimmick Joined Industry Two Years Ago—Today Leader in Minnesota Bus Circles—Aims of Association Outlined.**

**O**NE of the leaders in the bus transportation field of the great Northwest is Rodney S. Dimmick, president of the Minnesota Motor Bus Association. Mr. Dimmick is actively engaged in the industry as president of the Touring Car Bus Company and vice-president of the Jefferson Highway Transportation Company, both operating out of Minneapolis, Minn. Only two years ago Mr. Dimmick completed a business residence of nineteen years in Alaska. His perception of the vast possibilities of motor bus transportation as a supplement to railroad



*R. S. Dimmick*

travel was probably the result of living for nearly two decades in a country where travel has been so slow.

Looking over the field he decided that Rochester, Minn., was ripe for motor service from the Twin Cities. Although scores of people were going to the surgical and medical center of the Northwest, they had to take a round about railroad line, thereby losing much time. To remedy this Mr. Dimmick organized the Touring Car Bus Company and put on two Packard cars. To these he has since added two. The run is ninety-six miles each way. This company is now part of the Jefferson Company, and Mr. Dimmick is interested in both. He has great faith in the motor bus future of the Northwest and is demonstrating it by line extension as fast as possible.

Mr. Dimmick is president of a motor bus association which includes lines that cover the entire state, nine of which operate out of the Minneapolis Union Station and eight out of St. Paul's ter-

minal. He is not dismayed by the agitation which is charged to the railroads to have motor bus lines put on the 5 per cent gross earnings basis and to have them chartered like the railroads. However, Mr. Dimmick says the association is not out for any particular legislation and does not intend to be active at the St. Paul capitol this session of the Legislature, but wants only what is right.

"The railroads argue that they are paying a gross earnings tax and that we are not paying anything. As a matter of fact they have a lot of land grants, which help them out. We are carrying farmers to their doors and picking them up there or any place along the road, and giving them more frequent service than the railroads," said Mr. Dimmick.

"It is argued the buses are tearing the roads to pieces and we are not paying any more to the state for permission to operate than are the owners of individual cars. We don't tear up the roads as much as the smaller cars. When we make a round trip to Rochester how many touring cars go over the road in the same length of time? The Minnesota highway commissioner has publicly stated that buses are quite necessary on many lines."

Mr. Dimmick does not oppose the proposed state gasoline tax of a cent or two a gallon. It will provide additional revenue and under the provisions of the tax everyone coming into the state will contribute to the maintenance of the roads. He does not believe there would be serious objection to the proposal. Such a charge would, of course, cost the bus men more money, but, he said:

"We are perfectly willing to pay anything just, but we don't want to be put out of business."

### Mr. Moreton Re-elected

E. Foster Moreton was re-elected recently to the presidency of the Michigan Highway Transportation Association for the third term. Mr. Moreton has held that office since the association was organized. He was born in Detroit, Mich., Jan. 26, 1876, and has been in the trucking business in that city all his life. He is president of the Moreton Trucking Company, having started with his father, and acquired sole interest in the business at his father's death.

The company was established in 1871 and since that time has been cartage agent for the Detroit & Cleveland Navigation Company. It also has been appointed cartage agent for the Père Marquette Railway and will be agent for the Pennsylvania Railway, with the opening of the new terminal of that system of steam lines, in Detroit.

Mr. Moreton has always been active in association work, having been president of the Detroit Transportation Association, a local organization, since its formation. He is also first vice-president of the National Team & Truck

Owner's Association, and has considerable data at his finger tip regarding bus operations over the public highways.

The Michigan Highway Transportation Association has taken a hard stand against regulation by the Public Utilities Commission and has placed a record of no record in favor of all sorts of automobile taxes to provide revenue for the highway department, but expressed doubt about the right of the Public Utilities Commission to regulate transportation by trucks or buses. In lieu of such regulation, it is advocated that the State require a bond from each motor bus or truck operating on the highway of the State. It is also advocated that a State law be passed requiring the owner of commercial vehicles to carry personal liability and property damage insurance.

### Mr. Smith to Be Manager

C. Monroe Smith has been appointed manager in charge of the advertising sales staff and business departments of BUS TRANSPORTATION and *Electric*



C. Monroe Smith

*Railway Journal*. He comes to his new position from that of business manager of the *Commercial Car Journal*, published by the Chilton Company in Philadelphia. Mr. Smith was graduated from the Wharton School of Finance and Commerce, University of Pennsylvania, in 1905. For six years he was with Manning, Maxwell & Moore, Inc., selling machine tools and brass goods to the passenger car and truck manufacturers. He joined the Chilton Company, later becoming the Eastern manager of that company's publications and recently being made business manager of the *Commercial Car Journal*.

### Mr. Howell Heads Civil Engineers

F. D. Howell, vice-president of the Motor Carriers' Association, at Los Angeles, and general manager Motor Transit Company, Los Angeles, Calif., on Dec. 15 was elected president of the Los Angeles section of the American Society of Civil Engineers.

### Gordon Lee Joins Motor Industry

George Lee, formerly of the General Electric Co., has joined the motor industry. He was formerly a member of the board of directors of the General Electric Co. and was in charge of the company's engineering department. He has been with the company for many years and has been a member of the American Society of Mechanical Engineers. He is now a member of the Motor Carriers' Association and is active in its work.

Mr. Lee is a graduate of the Massachusetts Institute of Technology and has a degree in mechanical engineering. He has been a member of the American Society of Mechanical Engineers since 1900. He is now a member of the Motor Carriers' Association and is active in its work. He is also a member of the American Society of Civil Engineers.

"I am taking up the new work," said, "because I think it is one of the greatest developments of the future of the automotive industry will be in the field of the movement of goods and passengers by automobile transport in the form of taxicabs, street cars, and other types of freight and passenger carrying vehicles, and I am going to be as active in the railroads and street railway companies. Automobile transportation is an international industry necessary to meet the needs of the steamboat, the automobile, and the telegraph were the vehicles that brought about the world unification of the nineteenth century. Now automobile transportation is the vehicle of the twentieth century and I feel it is my duty to meet it."

"To the automotive industry of America has fallen the leadership of the direction of this world war of transportation, thus placing upon it an obligation of character and scope far exceeding the transportation of the United States."

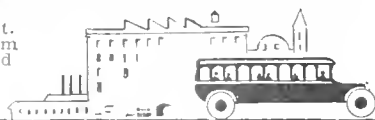
### A. J. Rutenber Dead

A. J. Rutenber, former treasurer and general manager of the Los Angeles Fredonia Truck Company, died at home in Jamaica, N. Y., on Dec. 10, after an illness of several months. Early in 1922 Mr. Rutenber was elected vice-president of the Fredonia Truck Company, which was then a member of the National Team & Truck Owner's Association. He was a member of the American Society of Mechanical Engineers and the American Society of Civil Engineers. He was also a member of the Motor Carriers' Association and was active in its work.



# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



Market conditions  
affecting the bus  
industry.  
Price changes in  
important  
commodities.

## Tire Prices Advance

**Ten to Fifteen per Cent Increase Announced by Leading Companies—Increased Production in 1923 Predicted.**

THE long expected general advance in tire prices was announced by all the larger Akron companies with two exceptions on Dec. 30. The price increases range from 10 to 15 per cent. The Goodyear Tire & Rubber Company and the Firestone Tire & Rubber Company, which did not make announcements of price advances, stated that the absence of definite announcements by them was not to be interpreted as indicating that their prices would not advance.

Definite figures were not available in the larger sizes at the beginning of the year because the new lists had not been completed. The B. F. Goodrich list became effective on Jan. 1, but other companies stated their new prices would become effective as soon as printed lists were in the hands of their dealers.

Increasing crude rubber and fabric prices made the increases mandatory, officials of the various companies stated in announcing the advances. The price of tires dropped more than 45 per cent from the peak during the past two and one-half years.

Several of the companies outside of Akron advanced their prices during December. The Kelly-Springfield Company announced a 10 per cent increase on Dec. 1. The Fisk Company followed a few days later with a 10 to 12½ per cent advance, but eliminated the dealers' price lists and established a larger margin for the dealer. The Howe Rubber Company made an increase of 10 per cent on casings and 15 per cent on tubes early in December and the Bergougnan Rubber Corporation issued new price lists showing a 12½ cent raise the latter part of November. The United States Tire Company fell into line Jan. 2 with a 10 to 12½ per cent increase.

The *Wall Street Journal* under date of Dec. 22 outlined the views of H. S. Firestone, president of the Firestone Tire & Rubber Company, in regard to the outlook for 1923. According to this article, he stated that:

"The automobile tire industry will go into new year with a surplus of 5,000,000 tires. This surplus is not to be regarded as serious because the present is a sellers' rather than a buyers' market, the situation of a year ago having been completely reversed. Mr. Firestone looks to the original equipment demand from automobile manufacturers as an outlet for any surplus now on hand. He estimates that the

first quarter of 1923 will see at least 500,000 automobiles manufactured. While these figures may seem high, other conservative authorities in Akron estimate that total production of automobiles in 1923 will be about 3,000,000. Mr. Firestone estimates that approximately 45,000,000 tires were manufactured in 1922, 35,000,000 during the first ten months. Total consumption for the year will be around 40,000,000."

## Smaller Pneumatic and New Solid Tires on Market

Anticipating the trend toward a wider use of the motor bus, the Firestone Tire & Rubber Company, Akron, Ohio, is now placing on the market truck-size pneumatics of smaller than usual diameter, also specially constructed solid tires. The new cords run in the following sizes: 30x5, 32x6, 34x7 and 36x8. These smaller diameters allow a reduction in bus heights of 2 in.

The new solid tire development is the Firestone Maxi-Cushion, designed to meet the needs of bus operators who require a live, resilient solid tire rather than a pneumatic.

## Gasoline Prices—Jan. 1, 1923

City	Cents Tank Wagon	Per Gal. Service Station
Albany, N. Y.	21	23
Atlanta, Ga.	19	21
Boston, Mass.	22	24
Chicago, Ill.	18	20
Cincinnati, Ohio	19	21
Detroit, Mich.	19 4	21 4
Fort Worth, Tex.	14	16
Indianapolis, Ind.	18 8	20 8
Jacksonville, Fla.	17	19
Kansas City, Mo.	17 5	19 5
Louisville, Ky.	19	21
Memphis, Tenn.	15 5	17 5
Milwaukee, Wis.	18 6	20 6
Mobile, Ala.	16	18
Newark, N. J.	21 5	22 5
New Haven, Conn.	22	24
New Orleans, La.	16	18
New York, N. Y.	22	24
Oklahoma City, Okla.	16	19
Omaha, Neb.	21 25	23 5
Philadelphia, Pa.	21	24
Pittsburgh, Pa.	21	23
Richmond, Va.	18 2	20 5
St. Louis, Mo.	21 5	23 5
St. Paul, Minn.	20 5	22 5
Salt Lake City, Utah	19	22
San Francisco, Cal.	21	24
Seattle, Wash.	24 5	27 5
Spokane, Wash.	21	23
Washington, D. C.	21	23

## Rolling Stock

Peerless Stage Lines, Oakland, Calif., recently purchased two Fageol safety coaches.

California Transit Company, Oakland, Calif., has recently purchased two Fageol safety coaches.

Eastern Massachusetts Street Railway has ordered for the purchase of three 2½-ton street car chassis which will be equipped with Paterson bodies.

Walter M. Aldrich, Norwich, N. Y., has added to his equipment a twenty-two passenger Fageol coach of the Intercity type.

Pacific Electric Railway recently purchased five specially designed White buses for use in feeder service in southern California.

The Washington Rapid Transit Company, Washington, D. C., recently purchased through Fred L. Martin, district manager of the Fageol Motors Company, a Fageol parlor car.

Do Brynn & Hesselgrave of the Bellingham-Sumas line, Bellingham, Wash., recently put into service a specially constructed eighteen-passenger bus, the cost of which is reported to have been \$8,000.

The Ohio Motor Bus Company, Columbus, Ohio, will soon install on the Broad Street Bryden Road line fourteen single-deck, thirty-passenger buses, built by the American Motor Truck Company, Newark, N. J.

Ben Davis Transit Company, which operates between Indianapolis and Ben Davis, Ind., lost three buses in a recent fire which entirely destroyed the company's garage near Indianapolis. The garage will be rebuilt.

The Northern Motor Bus Syndicate, 1211 Harmon Place, Minneapolis, Minn., has recently purchased two Fageol Intercity safety coaches. They are operated over the Minneapolis-St. Cloud route, a distance of 68 miles.

G. W. Bruce, College Park, Ga., recently purchased a sixteen-passenger bus from the Atlanta branch of the Republic Motor Truck Company. The body of the bus is the char-a-banc type and is mounted upon a Rapid Transit chassis.

The Tri-City Transportation Company, operating the Neenah-Menasha-Appleton, Wis., bus line, recently added to its equipment a twenty-passenger bus and is contemplating the purchase of another bus of the same capacity in the near future.

Michigan United Railways has had constructed a new bus mounted upon a specially designed Reo Speed Wagon chassis. The bus will be used to supplement the street car service in one of Lansing's outlying districts.

S. W. Knight, Portland, Ore., operating the Dunthorpe-Hivera line, has added a specially constructed thirteen-passenger bus to his equipment. The body was designed and built by Hal De Waide of Portland and is mounted upon a Reo Speed Wagon chassis extended 70 in.

Newburgh (N. Y.) Public Service Corporation, a subsidiary of the Orange County Traction Company, has placed an order with the Fifth Avenue Coach Company, New York City, for seven double-deck buses. This type of coach has been in use on the Newburgh Company's lines for several months.

## Business Notes

C. C. Bowman, chief engineer of the Standard Motor Truck Company, Detroit, Mich., has been appointed vice-chairman of the Frames Division of the Society of Automotive Engineers. Mr. Bowman has been serving on the frames division during the past year.

The Firestone Tire & Rubber Company announces the removal of the Toledo, Ohio, jobbing branch to larger quarters at Spielbush and Michigan Avenues in that city, and the establishment of warehouse distributing points in Lima, Ohio, and Fort Wayne, Ind.

The Paterson Vehicle Company, Paterson, N. J., has made plans for the construction, in the near future, of a 70 x 200-ft. two-story addition to its bus body plant. The present shop is inadequate to take care of the business already contracted for. The company has also recently built an extension to its forge and blacksmith shop.

## Advertising Literature

The General Tire News, house organ of the General Tire & Rubber Company, Akron, Ohio, devoted the entire October number to a discussion of bus tires, illustrated with pictures of buses from all over the country, equipped with General tires.

Hyatt Roller Bearing Company, Detroit, Mich., has just issued Bulletin No. 1204 concerning principally the new series Hyatt roller bearing. Fundamental data regarding sizes and load-carrying ability are presented for both the new series and small roller series bearings. Supplemental bulletins covering specific applications of Hyatt bearings to axles, transmissions, etc., will be compiled soon.



# BUS TRANSPORTATION



New York, February, 1923

## Shop Operations for Double-Deckers

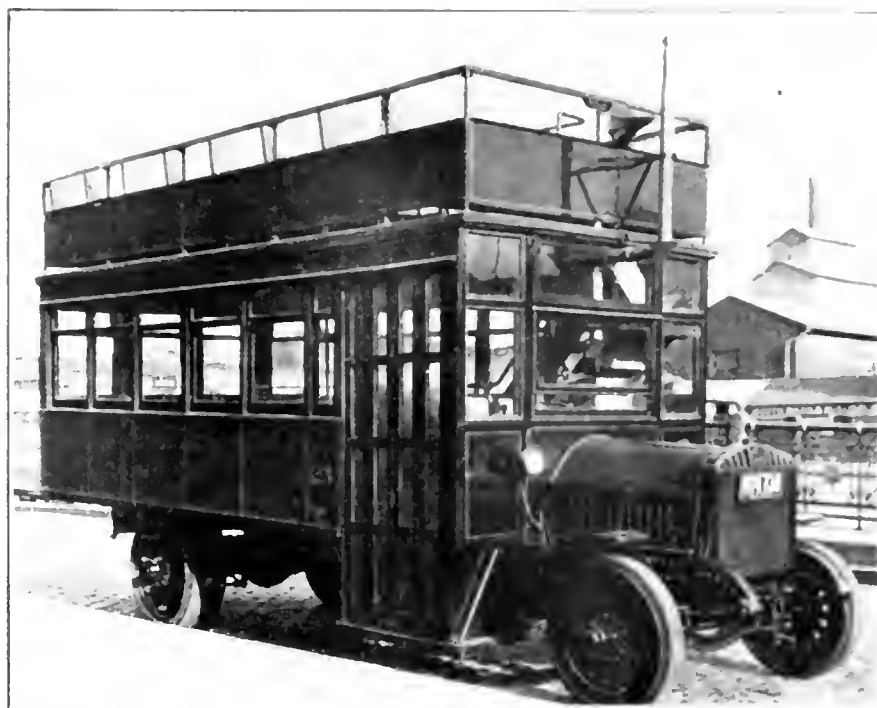
New York City Line Runs on Five-Cent Fare—Cost-Cutting Kinks Include  
Trimmer for Solid Tires—Traveling Shop Developed for Emer-  
gency Service—New One-Man Body on Trial

**K**EEPING 5-ton trucks running in bus service is some job. If you don't believe so, try and do it, or better, ask the Concourse Bus Line, Inc., which seems to be getting away with the job in New York City. This is just what one of the editors of BUS TRANSPORTATION has done, and the experiences set down here were given to him for the benefit of all good and true bus operators.

First let us take a look at the route and equipment, which represent, it is believed, the only 5-cent line in the world operating double-deck buses. At present a flat 5-cent fare is charged, from anywhere to anywhere on either of the two routes covered by the Concourse buses. So far as is known the claim for the world's championship is good. If there is another such line or bus system, here and now it is invited to stand up and make known the fact of its existence.

Under the supervision of the City Department of Plant and Structures, the Concourse line operates twenty double-deckers, each of fifty-passenger capacity. Of these fourteen are Diamond-T's and six are Packards. Standard 5-ton truck chassis are used, with minor modifications the company has made to meet the unusually severe service. The bodies are substantially built and one of them, which is described later in this article, has recently been remodeled for one-man operation.

Two routes are worked, totaling 10 miles of streets, both for the greater part of their length along the Grand Concourse, a wide boulevard leading through a newly built-up district to Mosholu Parkway, near the northern boundary of the city. Downtown one route starts at Fifth Avenue and 110th Street, the northeast corner of Central Park, and the other, known as the Hub Route, at Third



*Double-deck body as remodeled for one-man operation. Horn carries driver's announcements, and periscope gives view of top deck.*

Avenue and 149th Street, where trolley, elevated and subway lines from lower New York come together.

The Concourse is lined with huge apartment houses, which in the summer months supply a daily business of about 40,000 passengers. Traffic is growing rapidly, and the possibilities for the future are shown by the fact that last year some two hundred millions of dollars were spent for new buildings along the Concourse. Operating conditions also are likely to improve since the use of the central part of the Concourse is to be permitted. This is asphalted, whereas the side lanes used previously were macadam.

Most of the highway covered is straight and level, but life is made interesting for the bus operators, and also, and particularly, for the shop

mechanics, by a few stretches where good-sized hills, sharp turns, and rough pavements are found, each separately or all together. The main features of the heaviest city traffic, as pick-ups at every corner, frequent stops before the up-raised hand of the law, and a rush of business in good weather, are also present in full degree.

### HOME OF THE CONCOURSE BUSES

When the line was first opened in July, 1921, a building designed to service motor trucks was taken over and fitted up to serve as a place where the Concourse double-deckers could be fed, cleaned, stored, and if need be, doctored. The shelter is a one-story brick structure, 200x200 ft. in size, and located directly on the route. It was necessary to lower



*Concourse charging stand, capacity twenty 6-volt batteries.  
At left is shown portable lamp and long cable.*



*Blacksmith shop in corner of Concourse building,  
with forge, anvil and bench equipment*

the floor 3 ft. and at the same time the roof was mounted on 24-in. I-beams, running the full width of the building. With these as supports, only one row of columns is needed, leaving plenty of room to drive the buses. Gasoline is stored in five underground tanks, each of 1,000 gal capacity. Lubricant is kept in iron drums. Supplies of all kinds, and this includes repair parts, are stored only in moderate quantities, on account of the quickness with which they can be secured. All the important units, as engines, transmission, rear ends, are stocked, however, for both types of chassis.

#### COMPOSITION OF SHOP FORCE

From fifteen to twenty men are employed in the shop, the larger number in the summer rush season. These are divided about equally between day and night forces. The latter consists mostly of cleaners. The mechanics are paid from \$35 to \$50 for a six-day week, and this pay covers also an extra half day each week when they are held in reserve. In addition to specialists on engine and chassis repairs, blacksmiths and body builders are included in the shop force.

While no set program is followed for the overhaul of the buses, they are inspected carefully each day, and adjustments or replacements made whenever required. This practice is considered more effective than stated overhauls based upon mileage or time operated, since each bus does different work and should receive individual treatment to keep it in condition. The Concourse records indicate that the buses do between 3 and 3.5 miles

to the gallon of gasoline, not a bad performance considering all the conditions, and that no special fuel-saving devices are used.

Drivers are forbidden to make changes or adjustments in any part of the bus mechanism. They are particularly warned against touching the carburetor, ignition or braking systems. In winter, however, they must carry pliers, so that water in the cooling system can be drained if the engine is stopped for any length of time.

Emergency service on the road is provided by two vehicles, a 1-ton Ford truck and a 2-ton Rainier truck with slat-side body. The Ford body was made in the Concourse shops. From a distance this looks like an express-type body, with posts, top and curtains. Really it has a double floor, the upper one built across the top of the body sides. The space underneath contains drawers used for storage of small parts, while the tailgate, to which is attached a vise, can be used for a workbench. In the illustration the tailgate is shown opened, with iron rods supporting it at the rear end.

#### SHOP TOOLS AND EQUIPMENT

The type of work carried on in the Concourse shops is shown by the equipment in use. This includes a G. E. Tungar charging outfit with capacity for twenty 6-volt batteries, portable-type lamp clusters, engine stands, small electric drills and valve grinders, two portable cranes for lifting heavy units from the chassis, blacksmith's forge and anvil, and the usual benches and vises for hand work.

According to the Concourse company, the life of the solid tires used on its buses is practically doubled by the use of a trimmer designed to pare off rear tires. This device, which is here illustrated, consists of a cutter mounted on a heavy wooden stand, with two slides controlled by handwheels. One wheel moves the cutter across the face of the tire, and the other controls the depth of rubber taken off. By the use of this trimmer the tire is kept smooth until it is worn down to the limit, which seems to be almost to the steel rim. The rear tires thus treated give well over 15,000 miles of service.

#### CHANGES IN ROLLING STOCK

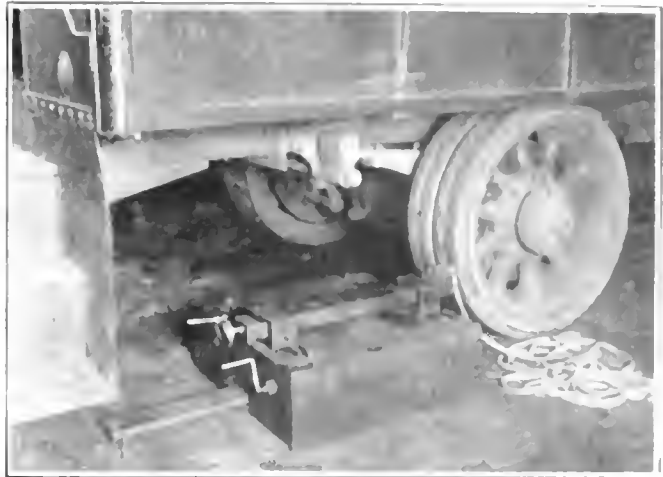
As mentioned previously in this article, a number of changes in the original buses have been made as a result of the one and a half years of operating experience. Vacuum tanks and governors have been removed, steel wheels have replaced the cushion type on the rear, and lighting batteries are used instead of generators.

The vacuum tanks were removed and gravity feed installed, after the connections to manifolds had given continual trouble by plugging up and breaking the joints. The cause seemed to be a dark crystalline substance which was lodged in the connections. Chemical analysis showed that the fuel contained only the normal amount, or traces, of sulphur, but it was thought this might have been sufficient to make trouble, because of the severe operating conditions.

A few cushion wheels are still used in front, but those on the rear



*No. 2 emergency wagon. Side drawers shown open, and tailgate down to serve as workbench.*



*Device for trimming rough spots on old rubber tires. Handheels move cutting tool at will.*

have been replaced by steel wheels. With the old equipment trouble was experienced with wheel bearings, after overheating had turned the grease to the consistency of a fluid. The cause, it is thought, was the closely spaced spokes on the cushion wheels, which interfered with air circulation, and thus forced the intense heat generated in the brake drums into the bearings.

Brake linings are replaced every 3,000 or 3,500 miles, the stitched and lapped type being used. Tests are now being conducted to determine the life of brake drums with hard and with soft linings. Hard linings wear out the pressed steel drums rapidly; in fact, the drums become so filled with ridges as to interfere seriously with braking after only 2,500 or 3,000 miles of service. Longer life from the drums might easily make up for the shorter life from the soft linings. The important thing, of course, is the combination of the two that will keep the brakes working right, and after this to keep down the operating costs.

In body construction also the company has taken steps to change equipment better to meet its peculiar conditions. A late development is the remodeling of the body on one bus for one-man service. This body was of the conventional double-deck type, with stairs at the rear leading to top deck and center door at the rear for lower deck. With the new construction the rear stairs have been removed, the rear center door turned into an emergency entrance, and a service door for both decks placed at the right of the driver, just as in one-man single-deck practice. The stairs are inside, between the driver's position and the left-hand

side of the body. Aprons at the top of the stairway can be closed in bad weather, when only the lower deck is used. A view of the body accompanies this article.

Several ingenious devices have been worked out for the convenience of the driver. A periscope arrangement gives him a complete view of the top or upper deck, a sound transmitting device with a horn on the top deck carries his announcements of streets to the passengers there,

and a combination flash and bell signal is available for use by all the passengers.

Because of the single coin fare basis and the use of a fare box passengers for the two decks, upper and lower, can be handled by the driver through the one entrance. The results since the first of the year of a trial of the new body are reported as satisfactory, and undoubtedly other bodies will be converted.

## Evolution of the Bus in Britain

**T**HE history of the motor bus in Europe proves Great Britain to be the pioneer nation in the development and use on a large scale of the heavier type of motor vehicles for passenger transportation.

From 1903 to 1906 Germany was the chief manufacturer of commercial motor cars in Europe, but Great Britain was the largest user. In 1905, when the motor bus boom started in London, chassis were largely imported from Germany, France or wherever they could be obtained.

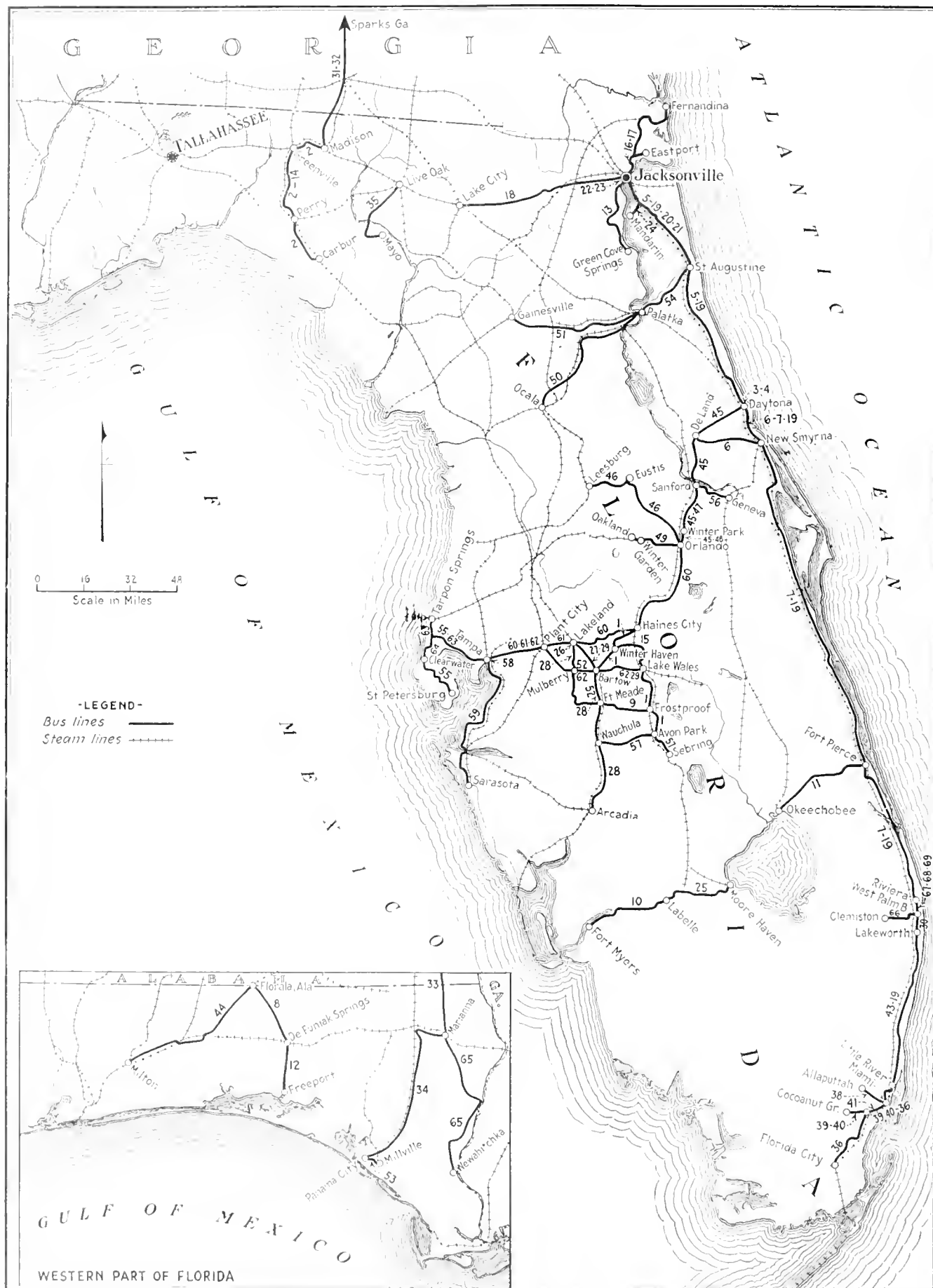
The motor buses of those days were huge, unwieldy things weighing more than 11,000 lb. The streets and roads were unprepared for them; the foundations gave and the surfaces became like the English Channel on a choppy day; but the heavy, lumbering cars still thundered along, shaking buildings to their foundations and developing all sorts of subsidiary noises in their own defective internal economy. None too efficient at the start, some cars, as they deteriorated, became expensive to run; some required a gallon of gasoline

for every 2½ miles of operation, and a British gallon at that. It was scarcely surprising then that an outcry arose against all sorts of heavy motor traffic, though it was the bus that bore the brunt of this movement. All sorts of drastic regulations were promulgated and the outlook was dark.

It was at this juncture that the type B thirty-four passenger omnibus was designed. This new bus, although far smaller and lighter than the older vehicles, had equal carrying capacity and was far superior in both cost and manner of operation.

The London General Omnibus Company has been the principal user of these buses. The Associated Equipment Company, Ltd., has made to date a total of 3,314 of these vehicles, of which the London company has purchased 2,000.

At present London operators use 1,000 of the thirty-four seaters, 1,010 of the forty-six seaters, and 645 of the latest fifty-four seat pattern on the roads. These vehicles of the whole are capable of accommodating 115,000 passengers at one time.



Bus operation in Florida is growing rapidly. At present 69 routes schedule 575 trips over 2,966 miles of highway. In a single day the 184 buses listed in the accompanying table travel nearly 50,000 miles





*Type of bus operating between Tampa and Lakeland*

## Buses Thrive in Florida

**With New Highways Connecting the East and West Coasts Cross-State Bus Routes Become a Possibility and Render a Service that Is Not Available on Rails—The Second Longest Bus Line in the Country Runs Between Jacksonville and Miami—Nearly Seventy Routes Are Now in Operation Over Approximately 3,000 Miles of Highway with an Average Fare per Passenger-Mile of 4 Cents**

**M**OTOR BUS transportation is both new and old in Florida. Tampa had a jitney war some eight years ago and Miami is just finishing one. Until the past four years, however, the bus as a public passenger conveyor was usually a built-over touring car or truck and generally home-made. Prior to that time the state had depended solely on the steam railroads for passenger transportation outside of the cities. But now Florida has awakened to the value of the motor bus as a means of passenger transportation not only for urban but for intercity, resort and country travel. At present there are sixty-nine routes, to be exact, operating over 2,966 miles of highway at an average rate of fare of 4 cents per mile of passenger haul. According to the schedules collected, these buses, of which there are 181, make 575 round trips daily and travel roughly 50,000 miles.

Fares are practically the same as charged by the railroads. There has been no visible attempt at joint rate-making. The bus men have met competition on an even score so far as rates are concerned and have gone

the railways one better, so to speak in giving more frequent service.

Approximately 50 per cent of the buses probably are migratory—that is, they are brought here for the winter and go north for the summer. On the east coast the migratory class will run as high as 75 per cent. Business on the west coast is a more stable quantity—generally because of the year around development of that section and also because of the fact that the buses there serve beach resorts that are popular with thousands of persons who do not go north or to the mountains.

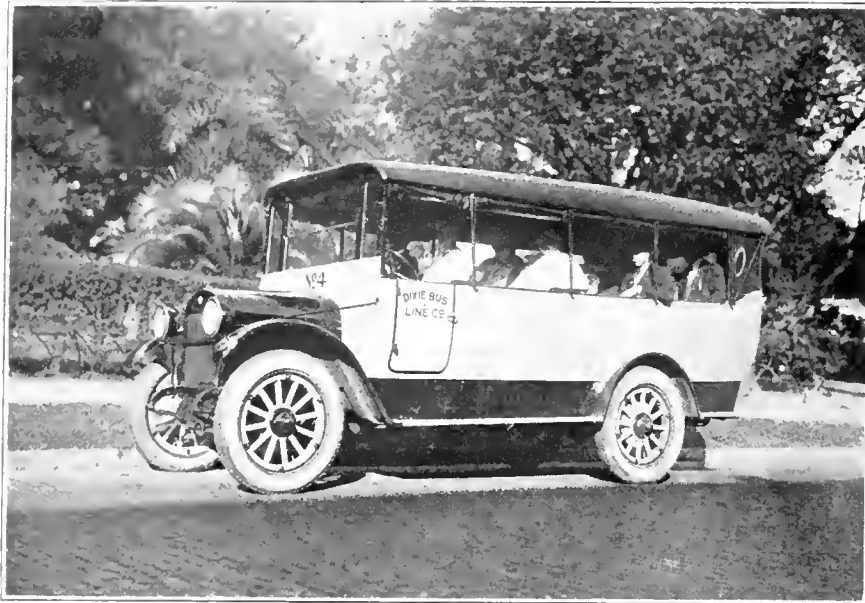
About 80 per cent of the buses now used were built for the business. Very few lines are maintained with touring cars or home-made buses. The most popular type is that with four to eight five-passenger full cross seats arranged back of the driver. At the ends of each seat are doors half way up. If a shower comes along curtains are resorted to. It is a street car type of bus with aisles down the middle, and windows were imported for the winter of 1921-1922, but they were not popular.

Many people still think of Florida

as being 99 per cent overgladed, and some sort of a wild southern pioneer state. The only part of such a thought that is true is that of being one of the pioneer states, perhaps, for it did not become a state until 1845, after being ceded by Spain in 1821.

For the most part, the state was not developed until after the heyday of the street car, and so, except in the larger cities, buses have taken their place as a means of transportation within the towns. As for interurban traffic, in which the greater number of buses ply their trade, they are by far the most interesting and comfortable method of traveling. Florida from a train window is uninteresting, not to say disappointing. From a motor bus window it is enchanting. In a country where it is irksome even to see motor trains or even electric railways are avoided. Partly for this reason, partly because of the distances of undeveloped country, interurban railway lines are practically nonexistent.

But here the motor bus has come into its own. Its value enhanced by the delightfulness of its use, all



*The standard vehicle of the Dixie Bus Line that operates between Lakeland, Bartow and Winter Haven*

the year round, by the marvelous smooth roads that make motor bus travel unusually comfortable, and by the fact that it is practically without competition for comparatively short distance travel, and often for quite long distance travel, too.

Bus transportation, however, is still in its infancy in Florida, and as time goes on there is real optimism on the part of the present operators that because of the steady growth and popularity of Florida as a winter resort bus operation will gain popularity as well and become more and more stable as the advan-

tages of the state as a resort become known.

The bus operator in Florida did not have to seek a solution to the question that has arisen in so many other localities, namely, "Shall the bus supplement or supplant the existing electric railway business?" as there are only five cities in the state where local trolley lines are in operation. These are Jacksonville, Key West, Pensacola, St. Petersburg and Tampa. In addition to these city trolley systems, there are two small suburban lines, one out of Miami and the other out of St. Augustine, each of which, however, is less than 10 miles in length.

General statistics of the state showing its population, the number of miles of railroad, both steam and electric, the miles of highway for the state as a whole and under the jurisdiction of the highway commission, the number of buses operated, which are shown in the accompanying table, will prove of value in obtaining a vision of the magnitude of operation of buses as compared to other transportation agencies within the state.

A more rapid development of the bus transportation business in Florida has been hampered somewhat by the fact that practically all of the connecting country highways, with the exception of the Dixie Highway, from Jacksonville to Miami, and the new Tiemiami Trail, which extends from Miami to Fort Myers, and which is as yet only partially completed, have in the main but 9-ft. wide hard centers. These hard centers have a

sub-base of crushed coral and a top dressing of asphalt with shoulders and sides that are back filled with the natural sandy soil of the locality. It is because of this light construction that the state has placed a weight limit of 16,000 lb. on any type of unit that is operated over these highways. The limit is for total weight, which includes the vehicle and its load.

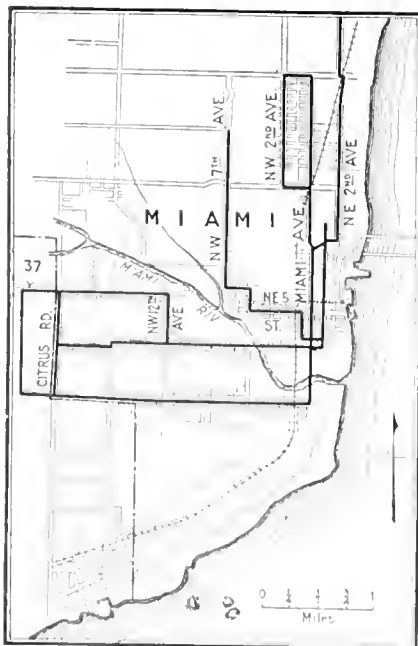
In a great many localities the narrowness of the roadway, which requires constant turning off the hard center, makes for uncomfortable passenger riding, especially when coupled with the light-weight buses that have to be employed. The same necessity of continual turning off is also highly destructive to the longevity of tires and makes tire costs a great deal higher than is found in other sections of the country.

It was some eight years ago, or about 1915, that the individually owned touring car type of "jitney" first appeared in Tampa and Miami. At Tampa, the public failed to give support to the enterprise and the owners soon found that continued operation in competition with the electric street cars of that city was not profitable and discontinued their service.

In Miami, however, where the former street car service was confined to practically two streets, with no attempt under way for extensions to keep pace with the rapid expansion of the city, the story has had a different aspect. Touring car jitney service has survived and flourished on streets not used by the trolleys, so that there are now close to eighty vehicles serving the outlying sections of the city. Operation is, however, forbidden on streets having trolley car service. An appeal on this action is now pending in the Supreme Court, where it was carried by the jitney association.

The city of Miami has, also, attempted to pass ordinances to regulate the jitneys and to limit the number in operation in that community. This effort has met with little success, due to lack of enabling legislation by the state. The city has, however, succeeded in compelling the touring car drivers' association to file a blanket bond covering liability to the public in case of an accident in any jitney. This bond is to the amount of \$10,000 and is filed with the city.

A glance at the map indicates several important bus centers—Orlando,



*Map of Miami showing the local transportation routes for both trolleys and jitneys.*



Tampa and Jacksonville perhaps being the largest.

Radiating from Orlando, a series of routes reach out to Daytona, into Lake County, southward to Lakeland, and with a branch to the Ridge country, from Haines City south. Because of its central location, and the fact that there is a system of good roads radiating in all directions, Orlando stands today as the principal motor bus transportation hub. Likewise Tampa is about the next largest center, with lines operating from Tampa to Clearwater and St. Petersburg, to Sutherland and Tarpon Springs, Dade City, Plant City and Lakeland, and southward to Bradenton and Sarasota. From Lakeland there are lines to Winter Haven, Bartow and Mulberry.

On the lower east coast the greatest boom to bus transportation has been given by real estate operators who, in developing the country within 30 miles of Miami, operate their own vehicles. From West Palm Beach buses operate into the interior.

During the winter months most of the bus lines out of Tampa and Orlando operate every two hours, and in some cases hourly. During the summer most of the services are twice a day, except between Tampa and Lakeland, Tampa and Clearwater and St. Petersburg, Jacksonville and Pablo Beach, Orlando and Sanford, Deland and Daytona, and perhaps other points where the service is three or four times each day.

It was not until 1918 that service utilizing large buses was first established. This was at Tampa, where A. D. Hartzell of that city formed the White Bus Line.

He now operates a line from Tampa through Plant City to Lakeland, a distance of 32 miles. Buses leave each city every hour from 8 a.m. to 5 p.m. The run takes an hour and forty-five minutes. He has another line from Tampa to Clearwater and St. Petersburg, also run every hour on the hour, which covers the whole Pinellas peninsula and reaches the Gulf of Mexico, a distance of 50 miles more. This trip takes two hours and forty-five minutes. There is a daily mileage of 640 between Tampa and Lakeland, and about 1,700 miles total for all branches. The White Bus Line operates buses of the type shown in an accompanying picture. They are of two sizes, carrying eighteen or twenty-one people. They are leather-upholstered and exceedingly comfortable. Four of them are operated on the regular schedule between



*One of the migratory sight-seeing buses that make daily trips between Jacksonville and St. Augustine.*

Tampa and Lakeland, six between Tampa and St. Petersburg, and a reserve supply of six is kept for emergencies and for sight-seeing trips. In Tampa the company has joined with the other bus lines in establishing a Union Bus Depot in an advantageous spot. The railroad union depot is three-quarters of a mile from the business district, consequently the bus lines are popular for short trips to neighboring cities and towns. The depot equipment includes seats, information bureau and magazine and cool drink stand.

Daily schedules are maintained during the winter between Jacksonville and Miami, a stretch of nearly 100 miles that winds whimsically along the Atlantic Ocean or through tropical jungles or through acres of citrus groves. From Miami to Palm Beach the winter service is hourly and in summer twice daily.

With the completion of a number of paved roads radiating from Jacksonville that city will take on new "bus life." Heretofore the only direction a bus could operate out of Jacksonville with any comfort was south, and to Pablo Beach.

Other large companies are the Orange Belt Line, Orlando, and Florida Motor Transportation Company, Miami. These companies maintain at their respective headquarters well-equipped garages and repair shops and do all of their own repair work, overhauling and repainting.

Central Florida in the vicinity of Lakeland is also one of the impor-

tant bus centers of the state. There are now four bus lines out of this city, operating fourteen regular buses, covering 1,892 miles and carrying an average of 500 passengers a day. In winter, during the height of the tourist season, these figures increase considerably, both for the number of buses and the number of passengers carried. These routes also cover all of the roads with buses. One reason that Lakeland is an important center is that here connections are made for Tampa on the south and Daytona on the north. The

#### ORANGE BELT AUTO LINE

Orange Belt Auto Line

1

2

3

*The daily report card shows quality of service of bus.*



and boat schedules in its public railroad time-tables. This of itself is interesting as the listing was entirely voluntary on the part of the railroad and not at the request or suggestion of the bus men or boat operators. So far as could be determined, this is the only instance in Florida where the bus has been recognized by the railroads as a necessary supplemental service to their own railroad operations.

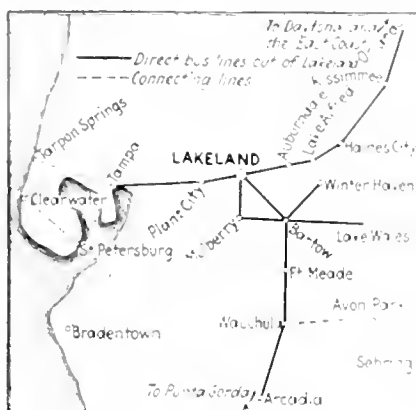
In only one section of the state has there been a definitely drawn question as to competition between the buses and the steam railroads. This was over the line from Marianna to Panama City. Prior to bus operation the one-way railroad fare was \$3.50, but with the advent of the bus the traffic of the railroad was cut into so heavily that in its attempt to hold its losing business the railroad made the round-trip rate 50 cents less than the former one-way fare, or \$3. Even in spite of this drastic cut the bus line is carrying practically all of the traffic between these two points.

#### MANY CONNECTING LINES

The value of any Florida bus system lies not only in the buses leaving any one town but in the connections with other bus lines. Starting from Lakeland, one can go almost anywhere in south Florida on board the bus.

At Wauchula the South Florida Bus Service connects with a bus for Avon Park and Sebring; at Bartow for Lake Wales and Winter Haven; at Mulberry for Plant City; at Winter Haven one may connect with a line that goes to Orlando, which is different from the direct line from Lakeland to Orlando.

It is almost safe to say that where there is a good road in Florida there is a bus line also. This is also true



Lakeland is an important bus center.

of the city streets and of the interurban highways. Many of the Lakeland have no street cars. A one-man bus, holding sixteen passengers, covers the city in half-hour runs, the south side on the hour, the north side on the half hour. The fare is 5 cents.

#### BUSES HAVE HIGH LICENSE FEE

The bus operators of the state feel that they are being unjustly treated when it comes to license fees. They believe that the state is attempting

to charge a license fee for the bus which is as high as that for a motor car. The license fee for a motor car is \$10.00, while for a bus it is \$20.00. The bus operators feel that this is an unfair charge, especially since the bus is used for public transportation and is subject to more wear and tear than a private motor car.

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FLORIDA EVERGLADES BOAT AND BUS LINES									
Through the Everglades, Drainage Canals, Lake Okeechobee and the Colosahatchee River									
Table 129									
Eastern Time	Ex. Sun	Ex. Sun	Ex. Sun	Ex. Sun	Ex. Sun	Ex. Sun	Ex. Sun	Ex. Sun	Ex. Sun
McCoy Bros. Everglades Line	7:45 AM	9:30 AM	11:15 AM	1:00 PM	2:45 PM	4:30 PM	6:15 PM	8:00 PM	9:45 PM
Smith Bros. Bus Line	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM	5:00 PM	5:30 PM	6:00 PM	6:30 PM
Hand Bus Line	4:45 PM	5:15 PM	5:45 PM	6:15 PM	6:45 PM	7:15 PM	7:45 PM	8:15 PM	8:45 PM
Burke Bus Line	7:00 AM	9:00 AM	11:00 AM	1:00 PM	3:00 PM	5:00 PM	7:00 PM	9:00 PM	11:00 PM
West Palm Beach	6:45 AM	8:30 AM	10:15 AM	12:00 PM	3:45 PM	5:30 PM	7:15 PM	9:00 PM	10:45 PM
Moore Haven, Fla.	7:00 AM	8:45 AM	10:30 AM	12:15 PM	4:00 PM	5:45 PM	7:30 PM	9:15 PM	11:00 PM
Moore Haven, Fla.	7:00 AM	8:45 AM	10:30 AM	12:15 PM	4:00 PM	5:45 PM	7:30 PM	9:15 PM	11:00 PM
Fort Myers, Fla.	7:00 AM	8:45 AM	10:30 AM	12:15 PM	4:00 PM	5:45 PM	7:30 PM	9:15 PM	11:00 PM
Fort Myers, Fla.	7:00 AM	8:45 AM	10:30 AM	12:15 PM	4:00 PM	5:45 PM	7:30 PM	9:15 PM	11:00 PM

The Atlantic Coast Line Railroad prints in its public time table the schedule of connecting bus lines for cross-state travel.

to hamper the development and future of the bus industry by imposing a vehicle tax that is larger than other states demand. Formerly the bus men paid only a general state license and their vehicles were classed as trucks. However, by a state act taking effect in 1922, the buses now pay three sets of taxes—a 1 per cent per gallon gasoline tax, a registration fee of 75 cents per hundredweight on the manufacturer's tonnage rating of the vehicle and finally a seat tax on the carrying capacity. This seat tax varies. Buses with from eight to sixteen passenger seats pay \$7.50 per seat per annum, whereas in case of buses seating more than sixteen passengers this seat tax rate is increased to \$10 per seat per annum. Touring cars for hire or engaged in regular service pay \$5 per seat. This same rate also applies to hotel buses that meet the trains. This tax rate explains perhaps more easily than anything else the reason for the small capacity buses.

This state vehicle seat tax displaced the right the various municipalities had under a special state law to impose a fee of \$50 per year for

charge for each passenger. In spite of these bus taxes no protection is offered to the bus man by the state in return. No franchise or exclusive rights are granted covering operation, and all that is necessary to exercise the right to operate is the payment of the vehicle fees required by the state.

This leads to the situation much decried by the established lines, which operate all the year round, in that during the winter or tourist season, when business is heavy, buses from the northern states emigrate to

Table 1—General Transportation Statistics for Florida

Item	1922	1921	1920
Area in square miles	55,560	55,560	55,560
Land	55,560	55,560	55,560
Water	55,560	55,560	55,560
Population	1,000,000	1,000,000	1,000,000
Large cities	1,000,000	1,000,000	1,000,000
Miles of waterway	1,000,000	1,000,000	1,000,000
Miles of railroad	1,000,000	1,000,000	1,000,000
Miles of highway	1,000,000	1,000,000	1,000,000
Number of buses	1,000,000	1,000,000	1,000,000
Open motor cars	1,000,000	1,000,000	1,000,000
Trucking cars	1,000,000	1,000,000	1,000,000
Large motor trucks	1,000,000	1,000,000	1,000,000
Medium motor trucks	1,000,000	1,000,000	1,000,000
Small motor trucks	1,000,000	1,000,000	1,000,000

Florida and compete on established runs with the regular bus men.

In Jacksonville there are a number of such buses which come down and engage in sightseeing business. This, however, is not a cause of general complaint as they do not run a regular schedule nor do they interfere with the regular scheduled runs from Jacksonville.

The jitney operators in Miami for some time past have had an active organization which has attempted to

conserve their interests. However, the regular bus lines have been without organization until November, 1922, when A. D. Hartzell called a general meeting of the bus owners of Florida at Daytona, and a temporary organization was formed which plans to take steps to seek a revision in the laws of the state covering buses so as to secure permanency and protection to the bus owners' investment and also a readjustment of the license fee.

been made a year-round paying venture when the difference in the winter and summer traffic is so great. The same company operates three bus lines running out of Asheville, N. C. Here the summer traffic is heavy and the winter traffic comparatively light, which allows buses to be shifted from one place to the other. The light season in Florida is the heavy season in Asheville, and vice versa.

The Florida Motor Transportation Company has chosen the White Company's chassis as standard equipment. Open-type passenger Avery bodies which are electrically lighted and upholstered in leather are used exclusively. Some buses seat sixteen passengers, others twenty-two, while a few can accommodate twenty-four passengers seated.

Buses are run on a regular schedule, and many compliments have been received on the way schedules are maintained. The buses are as dependable as trains except in case of unavoidable delays caused by unforeseen breakdowns. These are few, however, for the company by careful maintenance keeps its vehicles in excellent operating condition. Between West Palm Beach and Miami an hourly schedule is maintained in each direction. Between Homestead and Miami six trips each way are made daily, while but a single trip is made daily between Jacksonville and Miami. On this trip, which covers a distance of 390 miles, an overnight stop-over is made in Cocoa, which is about half way.

#### AMOUNT OF TRAFFIC HANDLED

In the winter season on the three routes mentioned the buses carry on an average of 50,000 passengers a month, while in the summer this drops off to about 12,000. The economic value of having an ownership in the three Asheville lines can be further realized from these figures. For the three Asheville lines the summer traffic runs about 30,000, while in the winter season only

## The Second Longest Bus Line Is in Florida

Year-Round Operation Secured by Use of Buses in Asheville, N. C.,  
During the Summer Months—Maintenance Handled in  
Own Shop by Force of Six Mechanics

THE second longest bus line in the United States is at present found in the state of Florida. There is a prediction, however, that within a comparatively short time it will have grown to the longest intrastate line in the country. At present, however, the line from Los Angeles to San Francisco is the one bus line that exceeds in distance the line operated by the Florida Motor Transportation Company. This company has its main offices in Miami, Fla., although it operates several bus lines out of Asheville, N. C.

To get the proper background for a detailed story of the extent of operations of this transportation company it is well to go back to its beginning.

Eight years ago two bus lines were started in Miami, the White Star Auto Line and the Clyde Passenger Express. The former ran from Miami to West Palm Beach, a distance of about 68 miles, and the latter from Miami to Homestead, which cities are about 32 miles apart. These two lines, both pioneers in Florida bus transportation, operated for five years.

Three years ago, or in 1919, a consolidation of the two lines was effected under the name of the Florida Motor Transportation Company. New equipment was added by the purchase of several buses from the Cleveland-Akron (Ohio) Line. For two years the Florida Motor Transportation Company maintained the runs of the two original lines, that is, from Homestead on the south to West Palm Beach on the north.

In 1921 the northern terminal was



*The interior of the bus indicates leather upholstered seats and ample aisle space, with center dome lights.*

changed from West Palm Beach to Jacksonville, which extension made the length of the through run nearly 400 miles.

During the winter of 1921-1922, thirty-six buses were operated from Miami. This winter, 1922-1923, the plans called for operating forty-two buses, which number includes several buses of an entirely new type to Florida. Last summer ten buses were in service.

It is interesting to stop right here and tell how the bus business has

#### Routes and Fares Charged—Florida Motor Transportation Company

Route	Length (Miles)	Fares		One-Way Rate per Mile (Cents)
		One-Way	Round Trip	
Homestead to Miami	32	\$1 10	\$2 00	3 43
Miami to Fort Lauderdale	26	1 00	2 00	3 15
Fort Lauderdale to West Palm Beach	42	1 75	3 50	4 17
West Palm Beach to Jacksonville	320	12 00	22 00	3 75
Miami to Jacksonville	388	13 50	25 00	3 50
Miami to West Palm Beach	68	2 75	5 00	4 05



*Several vehicles of this type are in regular service*

about 9,000 passengers are handled per month.

The one-way rates of fare charged on the Florida lines average less than 4 cents per mile and on the whole are about the same as railroad fares. The actual rates are shown in the accompanying table:

The fares charged between Miami and Jacksonville do not include hotel charges and meals en route. This is done so that passengers can stop overnight at Cocoa or wherever they please.

In the near future it is planned to extend bus service from Jacksonville to Daytona, a distance of 110 miles, and likewise from West Palm Beach to Daytona. This latter run will be nearly 200 miles long.

In Miami the company has its own garage at 38 N.W. Second Street. It is 50 ft. wide and runs through to N.W. First Street and has a total depth of 300 ft. Here

all repair work is done by six mechanics who are on the job at all times. Everything is done to keep the buses on the road instead of in the shop, for it is realized that a bus cannot make money unless it is in operation. Another advantage of carrying on all maintenance work in one shop is the lowering of operating costs. Florida operating costs average between 27 and 28 cents per mile. On the sixteen-passenger buses between 13 and 14 miles operation is obtained from a gallon of gasoline, while the larger buses average from 9 to 10 miles per gallon.

#### PASSENGER DEPOT PLANNED

In another year it is the intention of the company to transform the present garage into a large motor bus depot and to move its office there. Traffic demands in Miami by that time will be such that a

change will be absolutely necessary, especially during the winter months. This can be realized from the fact that Miami has grown 440 per cent in the last ten years and is keeping up this rapid pace today.

Passenger traffic is about equally divided between long-haul and short-haul riders. This is shown by extensive records for the past three years.

Ticket offices have been established in Homestead, Miami, Fort Lauderdale, Delray, West Palm Beach and Jacksonville. Others are to be added. In addition to the ticket offices maintained by the company, representatives of "Ask Mr. Foster" handle tickets. Losses through the theft of fares have been very small, but the officials believe it best not to put too much temptation in the way of the drivers. All drivers work on a straight salary, which varies from \$25 to \$35 per week, depending on the run on which they work.

Now for just a word or two about the three lines running out of Asheville, N. C.: One line extends from Asheville to Greenville, S. C., a distance of 62 miles over which four round trips are made daily. The one-way fare is \$1.75 and the return-trip ticket rate is \$3. The second run is between Asheville and Waynesville, a distance of 32 miles. Four round trips a day are operated. The one-way fare is \$1.25, with a reduction of 25 cents in the round-trip rate. The third run is from Asheville to Black Mountains, a distance of 18 miles. On this route an hourly schedule is maintained for twelve hours daily. The one-way fare is 75 cents and the round-trip fare is \$1.25. On these three Asheville routes eight buses are operated during the winter months and twenty in the summer season.

In the last analysis it is the cash that tells the story. What does all this work, this planning, this system bring in? Last year the company did a gross business of \$165,000 in Florida and about \$75,000 in Asheville. This winter everybody says there will be a bumper tourist crop in Florida, so people are more optimistic than ever.

The officers of the Florida Motor Transportation Company are: J. N. Oliver, president and general manager; W. H. Andrews, vice-president; S. P. Robineau, secretary; H. H. Moore, treasurer.



*Latest type sixteen-passenger bus with open type body on White chassis*

Operating Costs Are Given for Bus and Trolley Services—Also, an Account of Detailed Studies Made of Traffic Conditions on the Fifth Avenue and Chicago Motor Bus Systems

# Trolleys Favored for Surface Transport in Large Cities

By John A. Beeler

Consulting Engineer

IN ANY CONSIDERATION of the possibility of supplanting the present street car service in New York City with an equivalent bus service, the principal factors are the following: (1) Adequacy, (2) first cost, (3) cost of operation, (4) effects on public. It is necessary to consider adequacy on an all-year basis. No one would think of operating open street cars through the winter, and similarly the open-top double-deck type of bus employed on Fifth Avenue cannot be depended on for its full seating capacity in mass transportation throughout the year. Checks at Thirty-third, Forty-second and Fifty-seventh Streets of the number of passengers and seats of the Fifth Avenue buses in each direction between 7 a.m. and 7 p.m. taken on Dec. 15, 1921, show only a small percentage of seats occupied. At Fifty-seventh Street, the maximum load point, during the evening rush hour when the city's transportation systems are taxed to the utmost, only

65 per cent of the available seats on the outbound buses are occupied. The observations were taken on a fine clear day with an average temperature of 26 deg. F.

To inclose the upper deck of this type of bus would render the vehicle topheavy and increase the liability to accident. It would also reduce the clearance beneath the elevated and other overhead obstructions. The single-deck type of bus, seating approximately thirty passengers, seems best adapted to the general requirements in New York City.

The bus presents certain opportunities for obtaining greater mobility of service than the street car. It can load at the curb, and in blockades or breakdowns can run around the obstruction. It can be short-lined readily at any desired point and entirely rerouted on short notice in emergencies.

In capacity, however, the bus is less elastic than the street car, a factor of great importance in handling rush-hour crowds. Operating over rails in a fixed path, the street car is not only capable of smoother

operation but can with safety and economy be built larger. The bus, weaving in and out of traffic and operating over pavements, the best of which have irregularities, is subject to lurching and abrupt movements that should limit its capacity to one passenger per seat. The average car can provide readily for as many as four standing passengers to each five seated during the maximum load period, and there is flexibility in the application of such a standard.

When the rush-hour demands are greatly in excess of the base, as in all large cities, this difference of capacities puts a considerable handicap on the bus, and undoubtedly has much to do with the fact that no important city as yet is served solely by buses. Where they are used in conjunction with other transportation means it is noticeable that the rush demands on the latter must take care of the passengers who cannot be accommodated by the buses.

The surface lines in Manhattan now operate during the base 561 cars with an average seating capacity of

Table 1—Comparative Bus Operating Costs—Cents per Bus-Mile

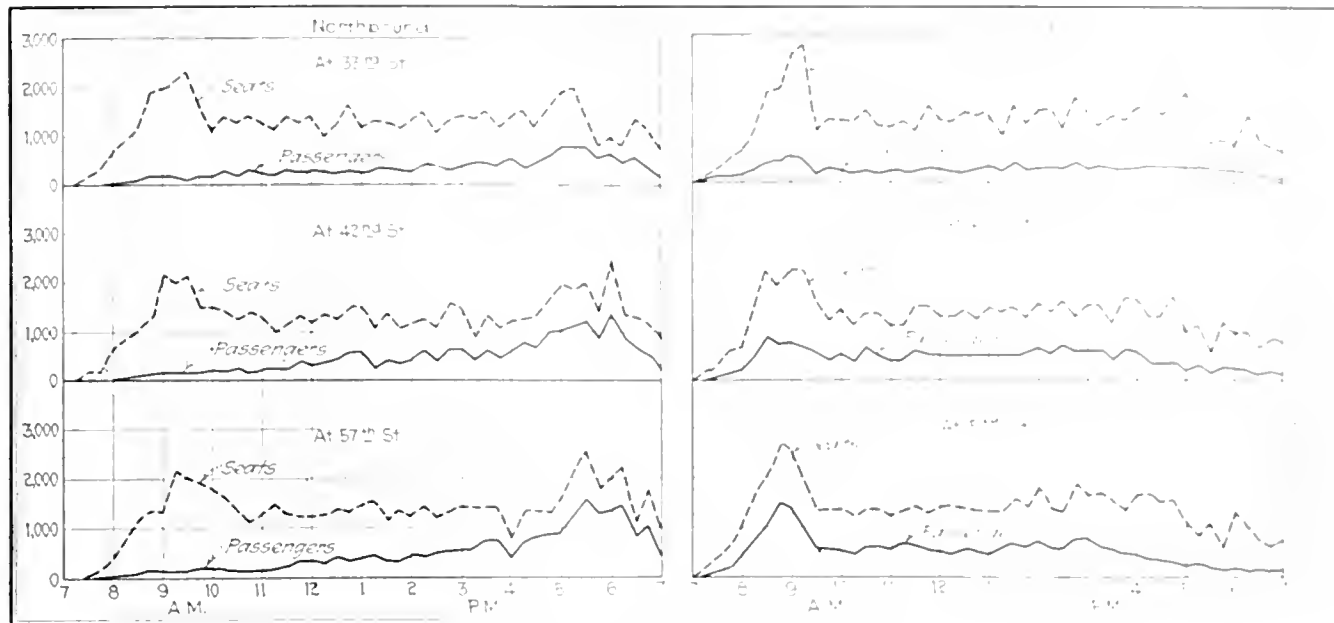
	Fifth Ave. Coach Co., N. Y. C.	London General Omnibus Co.	Detroit Motor Bus Co.	Chicago Motor Bus Co.	Goodyear Heights Motor Bus Line	Municipal Ry. Buses San Francisco	Connecticut Valley St. Ry. Buses	Winnipeg Electric Ry. Buses	Baltimore Transit Co.	Motor Transit Co., Los Angeles	Western Motor Transp. Co., Oakland	Tacoma-Olympia Stage Line	Washington (D.C.) Rapid Transit Co.
Number of buses	271	.....	28	40	12	5	3	7	20	.....	.....	7	14
Tires	0.98	.....	.....	.....	5.10	5.50	3.00	1.48	.....	3.06	3.50	1.82	1.72
Repairs	4.61	10.40	2.71	10.46	7.40	6.53	.....	4.73	6.50	3.83	4.70	0.43	1.10
Gas and oil	.....	.....	.....	3.97	5.80	5.14	3.88	5.90	.....	2.63	3.00	2.35	2.67
Conducting transportation	23.23	12.90	24.94	14.81	10.21	6.75	8.53	8.12	15.90	3.77	3.50	3.98	6.23
Traffic	0.16	.....	0.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.36
General and miscellaneous	1.62	2.10	4.14	5.42	.....	.....	.....	0.47	3.54	6.93	3.00	2.78	2.97
Injuries and damages	1.35	.....	0.91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Insurance	.....	.....	.....	.....	1.31	0.28	1.13	1.03	.....	.....	1.00	0.57	0.99
Maintenance and supplies	1.17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.40
Road expense	.....	11.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rent	.....	.....	.....	.....	0.42	.....	.....	0.53	.....	.....	1.50	.....	0.48
Total expense (operating)	33.12	37.30	33.05	34.66	30.24	24.20	16.54	22.26	25.94	20.22	20.20	11.94	16.92
Taxes	4.66	.....	0.16 <sup>b</sup>	2.43	.....	.....	0.40	0.23	1.39	.....	.....	0.15	0.28
Depreciation	2.42 <sup>a</sup>	1.70	3.90	3.20	5.62	1.72	8.00	2.28	6.59	.....	3.00	4.30	2.61
Fixed charges	0.97	0.61	0.39	1.39	1.26	.....	0.89	0.91	3.86	.....	.....	1.03	0.35
Total cost per bus-mile	41.17	39.61	37.50	41.68	37.12	25.92	25.83	25.68	37.78	.....	.....	17.42	20.16

Notes: \* Two-man operation.

<sup>a</sup> Additional depreciation in adjustment account.

<sup>b</sup> Does not include taxes.





Daygrams showing traffic handled on north and southbound trips, Dec. 15, 1921, when the weather was fair and the average temperature 26 deg. F.

forty-two, and in the rush periods 1,002 cars. To carry the same number of passengers on the basis of service stated above would require 786 buses in the base and 2,538 during rush hours. To allow for repairs, etc., 15 per cent should be added, bringing the total buses required up to 2,919. The surface car traffic of all lines in New York City is about two and one-half times that of the Manhattan lines. Applying this factor 7,297 buses would be required to handle the traffic now carried on the surface lines in the city. Based on the above estimate the outlay for the installation of a complete bus system, including garage and shop facilities, will be at the rate of \$7,500 per bus, or a total of \$54,727,500.

The car lines are already in use and the tracks are in the streets. They have a value which is being determined by the commission. To remove them and restore the paving of the streets will cost millions of dollars. While it does not directly affect this estimate, the question remains as to who would bear the cost of such a change. Undoubtedly it will be borne by the public in one form or another.

Looked at in a broad way, the cost of service includes the total expenditure, whether paid directly by the operating company or indirectly by the public. Although the bus system has the smaller installation cost, the major portion of the difference is that the railway must provide and maintain its roadbed, track and paving. With buses the expense for these items is, as a rule, borne by the taxpayers; but it is none the

less an important item in the cost of the service and for a true comparison must be included. Another important factor in determining the cost of service is the relative life of plant and equipment. The bus has a life of one-third that of a street car, or even less.

For the purpose of determining as accurately as may be the cost of bus operation the available statistics from operation of buses in New York, London, Chicago, Detroit and other localities have been analyzed. They are presented on a bus-mile basis in Table I. In this comparison only the two-man type of operation will be considered, for where the one-man bus is applicable the one-man car can be used equally well. Table I shows that the total cost of service, averaged from the American companies operating two-man buses, is 11.5 cents per bus-mile, exclusive of wear and tear on paving.\*

\*In the *Atlantic Monthly* for August 1921 this item is estimated by Philip Cabot to be about 10 cents per ton-mile.

Table H—Composite Operating Report of Fifty-two American City Street Railways, Six Months Ended June 30, 1921

	Per Operating Mile	Per Passenger Mile
Operating Expenses	40.5	1.1
Depreciation	1.2	0.2
Interest	7.2	0.2
Total	48.9	1.5

In New York the cost of street car operation is exceptionally high. The adoption of modern and efficient methods of operation should reduce this materially. An average of the cost of service, including taxes and interest, for street railways in the United States, as shown in Table H, is 45.7 cents per car-mile.

The greater capacity of the street car makes each car-mile operated a base hour service equivalent to 1.4 bus-miles, and each rush hour car-mile equivalent to 2.53 bus-miles, making a weighted average of 1.81 bus-miles to each car-mile over the day. One car-mile costing 45.7 cents is, therefore, the equivalent of 1.81 bus-miles costing 75.1 cents. Hence the cost of bus service, not including the indirect costs mentioned above, is approximately 65 per cent greater than the average cost of street railway service.

#### EFFECTS ON THE PUBLIC

A seat per passenger at all time is an attractive feature of bus service except that it sometimes involves waiting. To secure efficient operation it is necessary to fill all the seats during periods of heavy traffic. Consequently at such times there must be a surplus of passengers waiting, reservoir-like, along the route to do this.

In other ways the relative merit of the bus and street car service is penal largely on the territory served. In sparsely settled sections the smaller capacity of the bus would be an advantage and may even result in greater frequency of service. In many localities, especially where car lines as yet do not exist, the bus may



Table III—Vehicle Count at Fifth Avenue and 57th Street  
Data Taken Dec. 15, 1921

Time	Buses			Other Vehicles			Grand Total	Per Cent Buses
	North	South	Total	North	South	Total		
7:00 to 7:15	0	4	4	13	2	35	39	10.2
7:15 to 7:30	1	8	9	7	22	29	38	23.6
7:30 to 7:45	4	12	16	26	43	69	85	18.8
7:45 to 8:00	9	24	33	26	72	98	131	25.2
8:00 to 8:15	18	35	53	40	114	154	207	25.6
8:15 to 8:30	25	43	68	67	149	216	284	23.9
8:30 to 8:45	28	56	84	39	229	268	352	23.8
8:45 to 9:00	27	51	78	83	277	360	438	17.8
9:00 to 9:15	46	38	84	106	312	418	502	16.7
9:15 to 9:30	41	27	68	79	273	352	420	16.2
9:30 to 9:45	40	28	68	127	226	353	421	16.1
9:45 to 10:00	36	28	64	129	214	343	407	15.8
10:00 to 10:15	34	26	60	131	250	381	441	13.6
10:15 to 10:30	27	29	56	104	255	359	415	13.5
10:30 to 10:45	23	28	51	116	233	349	400	12.7
10:45 to 11:00	27	27	54	84	196	280	334	15.9
11:00 to 11:15	21	26	50	126	240	366	416	12.0
11:15 to 11:30	27	29	56	149	156	305	361	15.5
11:30 to 11:45	27	28	55	128	172	300	355	15.5
11:45 to 12:00	26	29	55	161	159	320	375	14.7
12:00 to 12:15	27	29	56	182	137	319	375	14.9
12:15 to 12:30	28	29	57	140	107	247	304	18.8
12:30 to 12:45	28	28	56	229	121	350	406	13.8
12:45 to 1:00	30	27	57	219	131	350	407	14.0
1:00 to 1:15	31	27	58	168	154	322	380	15.2
1:15 to 1:30	24	33	57	152	172	324	381	14.9
1:30 to 1:45	28	30	58	108	173	281	339	17.1
1:45 to 2:00	26	40	66	116	174	290	356	18.5
2:00 to 2:15	29	28	57	85	182	267	324	17.6
2:15 to 2:30	25	28	53	123	213	336	389	13.6
2:30 to 2:45	27	39	66	130	186	316	382	17.3
2:45 to 3:00	28	35	63	159	155	314	377	16.7
3:00 to 3:15	29	35	64	180	194	374	438	14.6
3:15 to 3:30	29	31	60	131	187	318	378	15.9
3:30 to 3:45	29	29	58	155	177	332	390	14.9
3:45 to 4:00	16	35	51	155	155	310	301	14.1
4:00 to 4:15	28	34	62	144	178	322	384	16.1
4:15 to 4:30	28	32	60	160	172	332	392	15.3
4:30 to 4:45	27	32	59	186	172	358	417	14.2
4:45 to 5:00	31	22	53	135	160	295	348	15.2
5:00 to 5:15	44	18	62	248	163	411	473	13.1
5:15 to 5:30	52	24	76	238	189	427	505	15.1
5:30 to 5:45	36	12	48	251	140	391	439	10.9
5:45 to 6:00	41	28	69	273	146	419	488	14.1
6:00 to 6:15	47	22	69	318	139	457	526	13.1
6:15 to 6:30	23	15	38	271	143	414	452	8.4
6:30 to 6:45	38	13	51	344	148	492	543	9.4
6:45 to 7:00	18	15	33	269	151	420	453	7.3
Total	1,334	1,349	2,683	7,010	8,133	15,143	17,826	15.05

Table IV—Average Speed of Buses, Fifth Avenue, New York

Section of Street	Period of Day	Number of Observations	Average Time in Minutes	Average Speed M.P.H.
Washington Square to 23rd St.	A. M. Rush	7	6.65	8.12
	Base	24	7.13	7.58
	P. M. Rush	9	7.11	7.60
23rd to 31st Sts.	A. M. Rush	8	3.50	6.86
	Base	26	3.56	6.76
	P. M. Rush	9	5.39	4.46
31st to 42nd Sts.	A. M. Rush	8	5.70	5.80
	Base	25	7.70	4.28
	P. M. Rush	9	7.50	4.40
42nd to 57th Sts.	A. M. Rush	8	6.50	6.93
	Base	25	8.28	5.44
	P. M. Rush	9	9.23	4.88
57th St. to 125th St. and 7th Ave.	A. M. Rush	3	21.5	10.15
	Base	14	22.2	9.73
	P. M. Rush	5	23.5	9.30
57th St. to 135th St. and Broadway	A. M. Rush	3	29.8	9.87
	Base	9	28.3	10.40
	P. M. Rush	4	28.6	10.28

Table V—Speeds of Fifth Avenue Buses on Different Routes

Route	Period of Day	Distance in Miles	Running Time in Minutes	Speed M P.H.
125th St. and 7th Ave. to Washington Square.....	A.M.	6.25	43.7	8.58
	Base		45.7	8.20
	P.M.		55.2	6.80
	Average		48.2	7.79
181st St. and St. Nicholas Ave. to 25th St. and Fifth Ave.....	A.M.	8.68	53.2	9.78
	Base		57.0	9.13
	P.M.		66.7	7.80
	Average		59.0	8.84
168th St. and Broadway to Pennsylvania Station	A.M.	8.50	57.2	8.91
	Base		59.0	8.65
	P.M.		68.7	7.43
	Average		61.6	8.27
168th St. and Broadway to Washington Square.	A.M.	9.10	61.2	8.92
	Base		67.7	8.06
	P.M.		74.7	7.30
	Average		67.9	8.05
72nd St. from 1st Ave. to Central Park West	A.M.	2.98	21.0	8.52
	Base		21.0	8.52
	P.M.		25.0	7.15
	Average		22.3	8.02
157th St. and Broadway to Pennsylvania Station	A.M.	7.73	54.2	8.56
	Base		56.0	8.29
	P.M.		62.0	7.49
	Average		57.4	8.08
193rd St. and St. Nicholas Ave. to 125th St. and 7th Ave.	A.M.	4.13	23.0	10.77
	Base		27.0	9.18
	P.M.			
	Average		25.0	9.91
Grand Average.				8.37

Note: Each of the above speeds is the average of four trips observed.

be much more economical on account of the smaller investment.

In congested districts frequency of headway presents a different prob-

lem. Concentration of passengers is here advantageous. For instance, in the heaviest half-hour of the afternoon eighty-eight buses on Fifth

Avenue passed Fifty-seventh Street northbound carrying 2,828 passengers. This was at the rate of nearly three buses per minute with an average load of thirty-two passengers. With the same number of street cars 6,688 passengers could have been carried. To accommodate this latter number of passengers on buses more than seven buses per minute would be necessary.

#### EFFECT ON STREET CONGESTION

At present the buses on Fifth Avenue represent 15 per cent of the total number of vehicles in the street. On account of their size and frequency of stops they are responsible for a great deal more than 15 per cent of the congestion, however. To increase the rate to seven buses per minute would, with the traffic interferences at intersecting streets, cause an intolerable congestion. Indeed, it is highly questionable if they could receive and discharge their passengers and move through the streets.

Table VI—Speed and Stops of Chicago Motor Bus Company's Buses

Made Oct. 19 and 20, 1921, from Center of Link Bridge, South on Michigan Avenue, West to State Street, North on State Street, East on Washington Street, North on Michigan Avenue to Link Bridge

Return Via	Time of Day	Distance in Miles	Time in Minutes	Number of Stops	Time of Stops in Seconds	Average Speed M.P.H.
Jackson	9:10 A. M.	1.824	15.50	13	228	7.06
Madison	11:16 A. M.	1.229	11.50	11	186	6.42
Montrose	1:35 P. M.	1.473	18.00	17	326	4.91
Montrose	3:43-30 P. M.	1.473	17.00	15	336	5.20
Montrose	5:24 P. M.	1.473	19.25	18	448	4.59
Jackson	7:33-15 P. M.	1.824	14.75	15	164	7.41
Total		9.296	96.00	89	1,688	
Average				8.57 per mile	18.96	5.81

Between Center of Link Bridge and North Terminals (Outside Loop)

From	To	Time of Day	Distance in Miles	Time in Minutes	Number of Stops	Time of Stops in Seconds	Average Speed M.P.H.
Link Bridge	Devon Ave.	9:25 A. M.	8.45	36.00	4	32	14.09
Devon Ave.	Link Bridge	10:25 A. M.	8.45	50.50	30	301	10.03
Link Bridge	Wilson Ave.	11:27 A. M.	5.06	25.50	19	105	14.01
Devon Ave.	Link Bridge	12:53 P. M.	8.45	43.50	30	255	11.60
Link Bridge	Edg B. Hotel	1:53 P. M.	6.90	32.50	11	76	11.65
Devon Ave.	Link Bridge	3:00 P. M.	8.45	43.00	18	232	11.78
Link Bridge	Edg B. Hotel	4:01 P. M.	6.90	34.00	3	46	12.16
Edg B. Hotel	Link Bridge	4:49 P. M.	6.90	35.00	18	129	11.82
Link Bridge	Devon Ave.	5:43 P. M.	8.45	45.25	39	298	11.20
Devon Ave.	Link Bridge	6:48 P. M.	8.45	45.25	23	173	11.20
Total			77.36	390.50	195	1,647	
Average					2.54 per mile	8.45	11.87

Table VII

SPEED AND STOPS OF CHICAGO MOTOR BUS COMPANY'S BUSES BETWEEN NORTH TERMINAL AND DOWNTOWN RETURN STREETS  
MADE OCT. 19 AND 20, 1921

Hours	8.11 hrs/ha
Mileage	86.66
Stops	284
Time of stops	3.335 sec
Average running speed	10.70 mph
Average number of stops	3.28 per mi
Average time per stop	11.74 sec

In referring to Fifth Avenue it is for the purpose of illustration only. Upon it operates America's largest bus line. The double-deck type of bus used there is admirably suited to the unusual traffic demands, which are largely shopping, sight-seeing and fair weather riding.

## FIFTH AVENUE OPERATION

The following table is from an article in the *Electric Railway Journal* of July 24, 1920, written by George A. Green, general manager and engineer of the Fifth Avenue Coach Company. The data apply to that section of Fifth Avenue below Fifty-seventh Street.

Period	Buses Per Hour	Headway, Seconds
Morning rush	193	18
Mid-day . . .	107	33
Evening rush	184	20
Sunday	144	26

The above figures indicate that the number of buses operated in the base is increased 80 per cent to cover the rush-hour requirements.

It is estimated herein that 786 buses will be required in the mid-day and 2,538 in the rush hours. This means that the number in service

Table VIII—Comparative Bus Speeds—  
New York and Chicago[illegible]

Table 1X. Comparative Street Car Speeds

Table X—Results of Twelve-Hour Traffic Count, 7 a.m. to 7 p.m. Thursday  
Dec. 15, 1924, Fifth Avenue Coach Company

South Bound Trips		%		%	
Point of Observation		1959	1960	1959	1960
Fourth Ave. at 57th St.	1,249	64,730	48.9	5	5
Fourth Ave. at 42nd St.	1,276	62,110	48.7	5	5
Fourth Ave. at 3rd St.	1,269	67,702	48.7	4	4
North Bound Trips					
Fourth Ave. at 3rd St.	1,258	61,433	48.8	5	4
Fourth Ave. at 42nd St.	1,285	62,424	48.9	5	5
Fourth Ave. at 57th St.	1,334	69,209	48.9	5	5

during the base will have to be increased 223 per cent if the buses are to accommodate the rush-hour patrons.

## OTHER STATISTICS

In addition to the tables mentioned above, Mr. Beeler's report contained considerable other statistical information.

The curves illustrate graphically the number of passengers and seats on buses of the Fifth Avenue Coach Company passing Thirty-third, Forty-second and Fifty-seventh Streets in each direction between 7 a.m. and 7 p.m. These observations were taken on Dec. 15, 1921, a clear day with an average temperature of 26 deg. F. The large percentage of seats unoccupied all day and even in the peak of the rush hour demon-

strates the fact that unprotected seats on the upper deck do not furnish all year service.

Table I shows in tabulated form the cost of service for thirteen bus companies. Four of these, including London and New York, operate the two-man type of bus. The remaining nine companies operate the one-man type of bus. In all cases the cost is itemized where possible with the information available. With taxes, fixed charges, and depreciation, the cost of two-man bus service is shown to be practically 44.5 cents per bus mile for the American companies.

Table II shows the revenue and cost of service of the average American city street railway. The figures given are the average of the actual revenue and cost for the six months period ended June 30, 1921, for com-

Table XI—Cost of One-Man Motor-Bus Service in Cents per Bus-Mile

	(A) Fairview	(B) Summit	(C) Fairview	(D) Summit
Maintenance: way and structure	0 0	1 0	0 0	0 0
Maintenance: equipment	8 5	10 6	9 0	8 4
Power	7 0	6 0	5 5	3 3
Conducting transportation	9 0	7 3	10 0	9 0
General and miscellaneous	3 0	4 0	3 8	4 0
Total operating	27 5	28 9	28 3	25 7
Taxes	0 8	1 0	0 4	0 4
Depreciation	1 9	5 6	8 0	1 8
Interest	2 5	2 0	1 7	1 1
Total cost of service	32 7	37 5	38 0	28 6
Average				34 2

Table XII—Cost of One-Man Street Car Service in Cents per Car-Mile

	1	2	3	4	5	6
Manufacturing overheads	40	20	10	5	2	1
Manufacturing equipment	100	20	10	5	2	1
Power	40	20	10	5	2	1
Constructing machinery	60	20	10	5	2	1
General and miscellaneous	100	20	10	5	2	1
Total operating	220	100	50	25	10	5
Taxes	20	20	10	5	2	1
Depreciation	20	40	20	10	5	2
Interest	40	40	20	10	5	2
Total cost of goods	300	200	100	50	25	10
Average	300	200	100	50	25	10

A. J. C. Thirlwall, railway engineer General Electric Company in *Electric Railway Journal*, Oct. 1, 1921.

B—E. F. Simmon, railway engineer Westinghouse Electric & Manufacturing Company, in *Electric Railway Journal* Sept. 19, 1921, with interest, taxes, and depreciation calculated on basis of costs and life of bus as given by Mr. Simmon.

c—Walter Jackson, consulting engineer, in *Electric Railway Journal*, Aug. 27, 1924.

D. C. W. Stocks, now editor of BUS TRANSPORTATION, in *Electric Railway Journal*, Sept. 21, 1921

F—Actual average costs, midwestern property operating sixty-six cars, year 1921, H. L. Andrews, General Electric Company, in *Electric Railway Journal*, Oct. 29, 1921.

cats. H. L. Andrews, *Great Lakes Fishery Journal*, Oct. 29, 1961.

Costs, H. L. Andrew, 1969, 104-105

H. K. F. SIMMER, *University of Cambridge, Cambridge, England*

1. *Journal of the Royal Statistical Society*, 1970, 32, 1, 1-10.

Barney's Local Supermarket  
Tax: 6.666666666666667%

panies operating in fifty-two cities as reported to the American Electric Railway Association.

Table III shows, in tabulated form, a count of vehicular traffic at Fifth Avenue and Fifty-seventh Street on Dec. 15, 1921, from 7 a.m. to 7 p.m. From 7 to 25 per cent of the total vehicular traffic on Fifth Avenue is buses, the average for the full twelve-hour period being 15 per cent. The average speed of the Fifth Avenue buses in various sections along the route and for different periods of the day is shown in Table IV. To one familiar with the territory, the speed attained in the different sections is comparable with the congestion encountered. The speed between Washington Square and Twenty-third Street averaged between 7.5 and 8 m.p.h.; in the section between Thirty-first and Forty-second Streets it was less than 4.5 m.p.h.; between Forty-second and Fifty-seventh Streets, it varied from 6.9 m.p.h. in the morning rush to 4.9 m.p.h. in the evening rush. The speed north of Fifty-seventh Street is greater than in any other section. This territory is very favorable for fast operation, there being long distances with few or no intersecting street crossings.

Table V gives speeds of Fifth Avenue buses for various routes at different periods of the day, the average for the system being 8.37 m.p.h. Each speed recorded is itself the average of values taken on four trips.

There were several tables of speeds of buses operated by the Chicago Motor Bus Company. In the Chicago Loop District the average over various periods of the day was 5.81 m.p.h. Outside the Loop District the average speed throughout the day was 11.87 m.p.h. In this section, however, the stops average only 2.5 per mile, and much of the territory is through parks and boulevards where there are few intersecting streets. Details pertaining to the different sections of the route are shown in Table VI, while a composite of this information is given in Table VII. In this connection it is interesting to note that the average speed of all the Chicago surface cars, as shown in Table IX, is 10.64 m.p.h. or practically the same as for the buses, while that of lines operating in sections similar to the bus territory is very much higher.

A comparison of the speeds of the buses operated in New York and in Chicago is given in Table VIII. The general average of 8.37 in New York

### Summary

*The analysis of the proposition to supplant street car service throughout the city of New York with buses may be summed up briefly as follows:*

**Adequacy**—Bus service to be adequate must provide each passenger with a seat at all times. The type of bus must be such that its full capacity will be suitable for all seasons and in all weather.

**First Cost**—Approximately 7,300 buses, with shop and garage facilities, will be required at an estimated cost of \$55,000,000.

**Cost of Service**—The cost of bus service will be approximately 65 per cent greater than street railway services.

**Effects on the Public**—Bus service should result in more frequent headway where light travel exists, but will introduce intolerable congestion where traffic is heavy. A seat per passenger sounds desirable but waiting in line is not popular.

is comparable to 10.70 in Chicago. The difference in speed is 2.33 m.p.h., or 28 per cent faster in Chicago.

Table IX compares the speed, between terminals, attained by the surface street cars in twelve of the largest cities in the United States. All of these speeds apply only to cars operated in city service. In several cities where a company operates both city and interurban service, the interurban cars have been omitted. With one exception Chicago heads the list, the average speed being 10.64 m.p.h. with stops averaging about six per mile. Exclusive of the Loop District, which in all probability is the most congested surface car territory in America, the speed averages 11.63 m.p.h. The approximate average speed in the other cities shown is about 10.2 p.m.h.

An analysis of the curves showing the traffic handled by the Fifth Avenue bus service indicates that when the buses are loaded heaviest, which is between 8:15 and 9:15 a.m. at Fifty-seventh Street, only 52 per cent of the seats are filled. The all-day average shows the proportion of seats occupied to be 37 per cent at Fifty-seventh Street, 35 per cent at Forty-second Street, and 21 per cent at Thirty-third Street. The general

average at these locations shows that 31 per cent of the seats furnished are occupied, which means an average load at these points of fifteen passengers per bus. In northbound traffic the average percentage of seats occupied between 7 a.m. and 7 p.m. was twenty-five at Thirty-third Street, thirty-five at Forty-second Street and thirty-three at Fifty-seventh Street. The general average of these locations is 31 per cent or the same as that southbound. Between 5:15 and 6:15 p.m., the hour of heaviest traffic northbound, 176 buses carried 5,580 passengers at Fifty-seventh Street. This is about the number that the subway carries in seven minutes on one track and at a much higher speed. Other tables give estimates of the cost of bus and one-man electric car operation as contributed to the *Electric Railway Journal*. The costs of one-man bus service, in Table XI, show the average to be 34.2 cents per bus-mile. The average of the first three columns, as given by Messrs. Thirlwall, Simmon and Jackson, is 36.1 cents. These figures allow for additional service for rush periods. In the last column Mr. Stocks gives a figure of 28.7 cents, which he states does not include any provision for more service during heavy traffic.

The average cost of one-man bus service as given in Table I (with charges for taxes, depreciation and fixed charges allowed, where not given, at the average rate of that for the other companies) is 27.1 cents. Little or no additional rush-hour service is provided by any of these companies, it is understood.

The foregoing indicates that the cost of one-man bus service, without provision for additional rush-hour service, would be about 28 cents, while, with allowance for additional service in the rush periods, it would be about 36 cents. However, taking 34.2 as the average and comparing it with the figure of 41.5 for two-man bus service, it is seen that the cost of one-man bus service is 82 per cent of the cost of two-man service.

The cost of one-man street car service as given in Table XII is 26.2 cents per car-mile which is about 57 per cent of the cost of two-man car service. Thus, it appears that the possibilities for more economical and efficient operation are greater with the one-man street car than with the bus. As has been pointed out in the report, wherever one-man bus operation is applicable, one-man car service is equally so.

# Motor Bus Activities at the National Automobile Shows

**Meetings and Exhibits Indicate that General Advances Have Been Made in Construction—Many Parts Designed for Bus Service—  
Railroad Executive Favors Co-ordination of Rail and Motor Transport**

**A**DVANCES in the construction of motor vehicles as a whole and in those designed for buses in particular were everywhere in evidence during the national automobile shows held during the first month of the year in New York and Chicago. Another sign of the interest taken in motor transport was the address given by a Pennsylvania railroad executive before the Society of Automotive Engineers, and warning them that co-ordination of the different forms of transport, road and rail, whether carrying freight or passengers in mass, was absolutely essential for the good of the public and of all the interests concerned.

The show season, in addition to furnishing manufacturers with a chance to display their latest equipment, also offered an opportunity for meetings of various organizations, manufacturing and technical, and for the discussion of the more pressing problems which the industry must face and solve.

At meetings of the National Automobile Chamber of Commerce, to which all the leading manufacturers of passenger cars and motor trucks belong, matters of interest to bus operators were also discussed. At a motor truck conference, the main subject was, how to get the money for them. A representative of a financing company made important recommendations as to installment sales methods.

A trade commissioner of the U. S. Department of Commerce told of extensive bus operation, mostly of small or light vehicles, in Japan, China and other parts of the Orient.

The Motor and Accessory Manufacturers Association, representing all the makers of parts for automotive vehicles, elected new officers at their annual business meeting.

To one interested in bus transportation, it was remarkable to see the number of bus parts shown in strictly passenger car shows, but limited to passenger cars only as far

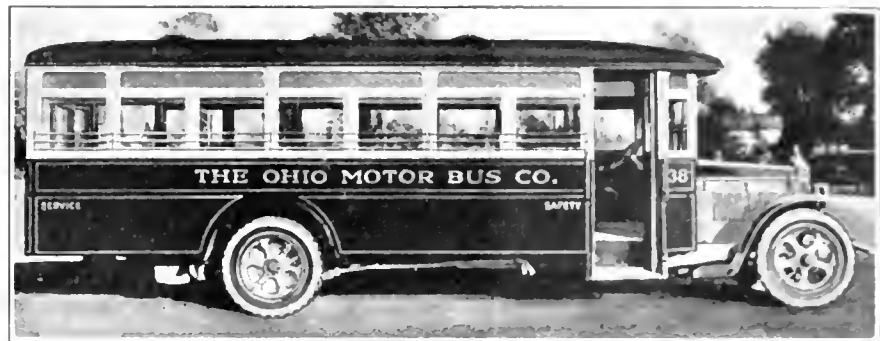
as the exhibits of complete vehicles and bodies were concerned.

The various shows at New York and Chicago brought out a number of exhibits of buses and bus parts, while in addition many manufacturers, particularly of the lighter equipment, had quarters at the hotels where they could entertain their customers and show their wares. It will be impossible here to mention all the exhibits of equipment useful for bus service, but mention may be made of some of them.

The Chicago shows at the end of January brought out buses and parts

is Shuler, and rear axle Wisconsin double reduction. Wheels are Budd steel disk, with 36x6 front and 36x6 dual rear pneumatics. Sixty-four inch springs are mounted on the rear and Westinghouse air brakes are fitted on the vehicle exhibited. Leece-Neville starting and lighting equipment is included.

In the field of engines and accessories, the new bus engine offered by Waukesha stood out. This is a four cylinder job with 4-in. bore and 5½-in. stroke. The cylinder heads are of the Ricardo type, and give the effect of a semi-spherical top to



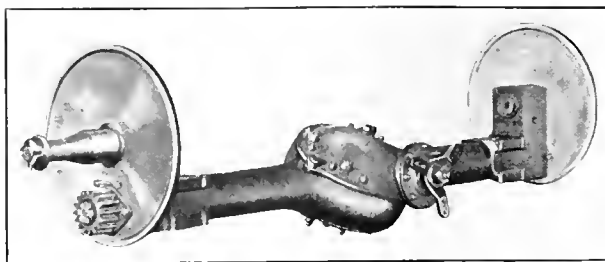
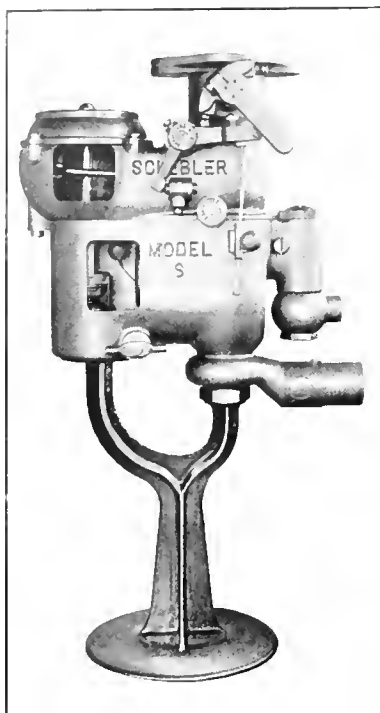
*Type of thirty-passenger bus shown by American Motor Truck Company at New York body show*

not exhibited at New York. Defiance and Passenger Lorry buses were additional exhibits, as were also Buda engines, Bethlehem wheels, Borg & Beck clutches, Fuller transmissions, Shuler front axles, Lavine steering gears, Rome-Turney radiators, Teagle magnetos, Owen Dyneto generators.

A composite frame features the Passenger Lorry design; this frame embraces in one structure, chassis, frame members and body framing.

The Royal Coach, as the design of the Defiance Motor Truck Company is called, was exhibited with a Bender twenty-passenger de luxe body of the sedan type. The chassis, which has recently been developed, has a 200-in. wheelbase. The engine is a Continental six-cylinder, the front axle

the combustion space; this permits the use of a higher compression ratio, and therefore greater power and efficiency, it is said, without knocking. The valves are of the L-head type, and aluminum pistons are used. Another feature of this engine was the use of "radiated" bearings on the connecting rods, these having grooves on the edges to carry away heat. Other engine exhibits included the Midwest with one six-cylinder and three four-cylinder designs, these including units for both single-deck and double-deck bus service. Continental showed seven engines, four four-cylinder and the rest six-cylinder types, for all types of service, passenger car up to the heaviest size of truck. Crankshafts, with counter-

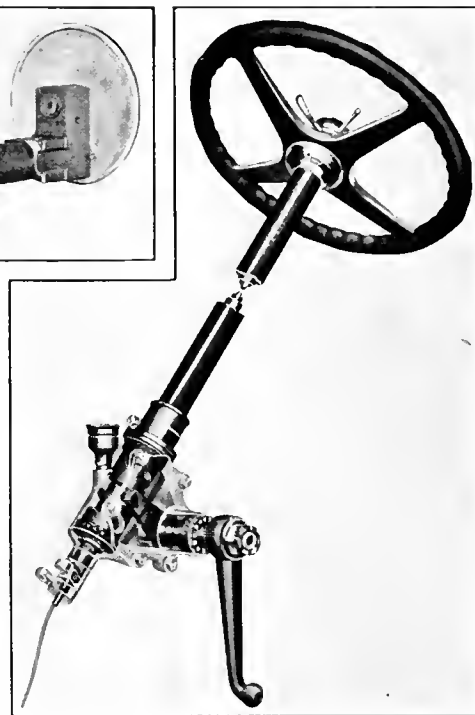


### Chassis Components at National Shows

*At top—Clark-cranked type,  
with 70-in. track.*

*At left — Wheeler - Schebler  
Model S carburetor, with air  
and fuel controls intereconnected.*

*At right—Ross steering gear,  
with variable gear reduction  
obtained by cam and lever  
mechanism.*



balances forged integral, were shown for the first time by Wyman-Gordon.

A new carburetor, known as Model S, was shown by Wheeler-Schebler. In this, the air valve and needle controlling the flow of gasoline are interconnected. Thus, when high power is needed, the area of the opening for air is increased, keeping the suction required at a minimum. On account of this type of construction the Model S carburetor, it is said, gives high power at high speed and dependable action at low speed as well. The Model S design is shown in the illustration.

Complete lines of electrical equipment were shown by Scintilla, while Remy and Leece-Neville had starting and lighting equipment on exhibition. Remy showed its new bus generator and control box. The generator is a six-volt unit designed to carry 40 amp., with thermostatic regulation. The control box includes resistance and relay units, fuses, and all switches for ignition, outside lighting and interior lighting. It can be mounted on the dash or on the side of the body at the left of the driver.

Bus axles were especially noticeable, both at the shows and at hotels. The Clark-built Fifth Avenue Coach L-type axle received a great deal of attention. This is of the cranked internal-gear type. The center and cranks are a solid drop forging, and the wheel spindles are driven in to these cranks. The axle which is shown in the illustrations here, has

an inclined drum in which is mounted the first (bevel) gear reduction. In addition Clark showed a 2½-ton bevel-gear single-reduction axle, said to be the largest of that type ever built. Timken-Detroit exhibited two sets of its wide gage bus axles—68 in. front gage and 72 and 74 in. rear gages respectively. Also it displayed a front axle, with brakes, developed for taxicab service. L-M double reduction for chassis up to 2½ tons were shown, and also the same make of 5-ton axle with a triple-gear reduction.

Among the important chassis components were the transmissions shown by Brown-Lipe. This company is supplying the horizontal type of transmission for low-level buses. For interurban bus service the fourth speed is geared up, with direct drive on third speed. For bus service, where quiet operation is desired, the transmission gears on second and high speeds are ground and lapped.

A three-speed transmission of the chain-drive type, as developed by the Fifth Avenue Coach Company, was exhibited by the Morse Chain Company. This is substantially similar to a constant mesh gear transmission, with chains used in place of gears.

A new line of steering gears was displayed by Ross Gear & Tool Company. The four models are of the cam and lever type, as illustrated in the phantom view. The cam mechanism replaces the screw used previ-

ously in Ross gears; it is mounted between ball bearings which take both thrust and radial load. When the steering wheel is turned, the cam turns in its bearing and moves up and down a diamond stud projection on the inner side of the lever. The lever then rotates the trunnion shaft, which is pivoted in the sides of the housing. The total turning from full lock of the wheels on one side to full lock on the other is made with from one and three-fourths to two and one-half turns of the steering wheel, varying with the model. The principal feature of the new gear, however, is the variable pitch on the cam. In the center the angle is very slight, whereas at the ends it is greatly increased. This gives a low reduction of the gear in mid-position, which is said practically to eliminate all road shocks when the vehicle is driven straight ahead. Rounding a corner a very slight turn of the wheel is required, and the ratio becomes constantly greater, the further the wheel is turned. The housing for the cam is assembled with shims, so that it is an easy matter to retain the right adjustment between the stud and the cam surface. Shim construction is also provided so as to permit easy adjustment of the ball bearings.

Several 20-in. rim wheels, for "doughnut" tires, were shown. The Budd Wheel Company had one of these for a 32x6-in. tire, and also displayed its 36x6 dual pneumatic disk wheel. A 32x6-in. wheel of the

laminated hardwood type was shown by the Hopkins Manufacturing Company. Others were the Morand type of cushion wheel, Clark steel wheel in disk and spoke types, and Van wheels in metal (malleable) and aluminum spoke construction.

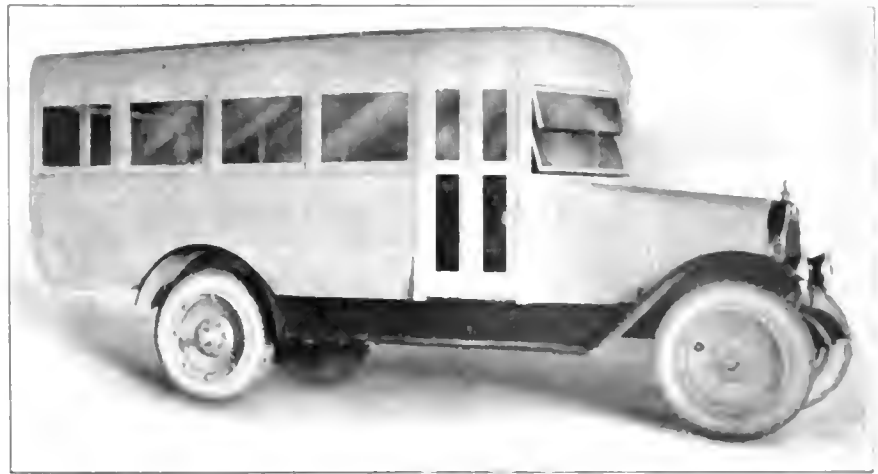
Among accessories for rolling stock may be listed the Perfection and Linendoll heaters, the new line of Dietz Sentinel electric headlights and tail lights for heavy duty service, Folberth windshield cleaners driven with the help of the engine, and Berkshire windshield wipers, operated by a small electric motor mounted above the windshield. The Cleveland Pneumatic Tool Company displayed Gruss springs in Transport Special and Heavy Duty types for bus work.

#### SHOP TOOLS AND EQUIPMENT

All sorts of devices for intensive maintenance were shown at the Palace, and an overflow show was held at Madison Square Garden during New York Show week. At the Chicago shows, also, maintenance equipment was well represented.

Lubricating devices included high-pressure guns, such as Bowen-Empress, Alemite, and the Warner Oil Gat. The last is put out by the Warner-Patterson Company and works with a trigger like a pistol. It is said to feed 600-W. oil at more than a ton pressure.

Lamp stands or portable floor lights were shown by several companies. The Manley floor light is mounted on a stand with a bracket arranged so that the lamp arm can be set vertical or dropped down for use under the chassis. Battery charging outfits, some of them including electrical testing equipment, were exhibited by the General Electric Company, Roth Brothers Com-



Whitfield coach with Fabrikoid panels, shown at Body Exposition, New York

pany of Chicago, and by H. E. Witwer, Cleveland, Ohio. The G. E. Company displayed the Tungar charger, a current rectifier. For larger installations the Roth constant potential system was shown, consisting of an electric motor, direct connected to a dynamo, and with a charging bench for the batteries.

Air compressors of the two-stage type with volume and pressure sufficient to service giant pneumatics were exhibited by Brunner, United States Air Compressor Company, American Pump & Tank Company, and the Utica Manufacturing Company.

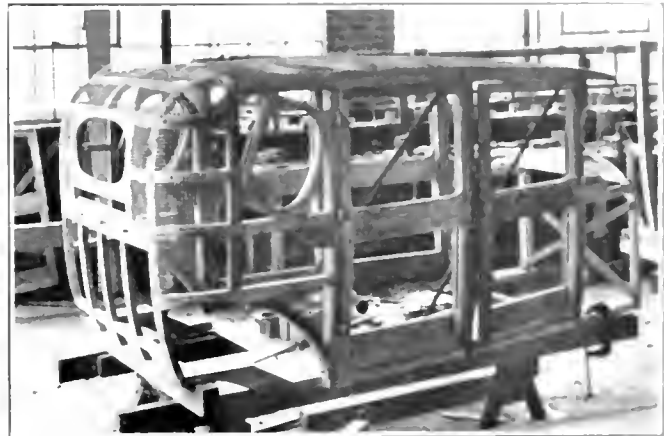
Presses and attachments, arbor and wheel, and portable hoists and jacks were shown by Manley, Ekern-Turk, Millers Falls Company, and the Midwest Manufacturing Company, Minneapolis. The Auto Table Company, Inc., displayed a wheel table which includes a work bench and twelve trays for small parts. Also an auto trolley consisting of two cradles each with a pair of rollers to be mounted under the rear

wheels, so that the engine can be driven and the wheels turned in making brake adjustments and in locating engine trouble. A runway or auto table built up on structural steel channels and standing about 21 in. above the floor was shown. This is recommended for all kinds of lubricating, repairing, cranking, draining, oiling, greasing of standard gage cars, although it can be built for wide gages if required.

At the Automobile Body Exposition held in the Twelfth Regiment Armory three complete buses, each of a different type, were shown. These included the American Motor Truck Company's thirty-passenger street-car type of bus, and its new seventeen-passenger six-cylinder Model F was used for demonstration purposes. There was also a seventeen-passenger Whitfield Body with Fabrikoid, craftsman quality, panel covering on a Larrabee-Devo speed chassis, and a forty-passenger Maccar sight-seeing char-a-banc, with a body designed and built by FitzGibbon & Crisp, Inc.



Frame of body described at S.A.E. engineering session. Proposed to cut cost of closed passenger cars



Same body with a complete exterior body finished with Fibrikoid. Type of tubular



All told there were sixty-eight exhibitors. Their exhibits were varied and included practically everything for bus and automobile bodies, from panel materials to the smallest fittings used in high-class custom-built bodies.

Exhibits of panel materials included Haskelite, Plymetl, Vehisote, Agasote and Steelasote. Some of these were exhibited on completed bodies, or by means of photographs. Finishing materials included chemicals for preparing metal panels for painting, such as Peroline and Deoxidine, paints and varnishes by Valentine, Sherwin-Williams, Murphy and Zapon. Two exhibits demonstrated that waterproof sandpaper could secure quicker and more finished results than the method using pumice stone and oil.

Among body accessories were the Petry, Bovey and Comfort exhaust heaters, as well as dome lights fitted with one or two lamps, with or without special globes. Hale & Kilburn exhibited bus seats and seat covers. Several types of D'Arcy springs were shown. There were other exhibits of hardware, door locks and hinges, body irons, service, rear door and step control apparatus, window anti-rattlers, window regulators and curtain snaps. In the Eberhard Manufacturing Company's exhibit was a bus body built to demonstrate the application of Emco body irons. The Cleveland Hardware Company showed a new type

mire Economic Service, Inc., discussed business conditions for 1923 and indicated that business conditions for the first half of 1923 would be at least good, but there is a tendency for the price of materials used in body building to increase. Addresses were also made by Alfred Reeves, general manager of National Automobile Chamber of Commerce,

and L. Clayton Hill, assistant general manager of the Society of Automotive Engineers. Mr. Reeves presented statistics concerning the growth of the automobile industry in general. Mr. Hill spoke of the necessity for standardization of hardware and glass sizes in automobile body construction and described S.A.E. standards activities.

## Engineers Meet at New York Show

High-Compression Engines, Investigations to Improve Fuels and Closed Body Construction Discussed by Society of Automotive Engineers—  
Standards for Tail-Lamps and Lubricants Proposed

THE Society of Automotive Engineers held a meeting Jan. 9-12 in New York. Details of construction were proposed for standardization, with a view to making well-settled practice available for the benefit of manufacturer and user alike; obtaining greater fuel economy was discussed, from the standpoint of the refiner and of the designer of engines; and the parallel problem of getting engines to operate better on present fuel was also reviewed. Body engineering was taken up at two sessions, and great interest was evidenced in a proposed padded or soft type of body, so far developed only for closed car designs, but considered useful for the bus body.

### S.A.E. STANDARDS

Some sixteen reports relating to standardization were adopted. These include sizes of front-axle hubs on pleasure cars, thickness of stock for runningboard brackets, and rivet location for facings of multiple-disk clutches. The S.A.E. standards for

ing, several standards of interest to bus operators were proposed. Incandescent lamps for automobile headlamps should be of the gas-filled type and of 21 cp. The tail-lamp should be weather and dustproof and so constructed as to withstand ordinary shock and vibration. The light from the ruby lamp must be visible for a distance of at least 500 ft. Lamps are not considered acceptable if found unsatisfactory for any of the following reasons: Unstable or bad mechanical construction; unduly dark or bright areas or excessive contrast in the illumination on the registration number plate; cut-off of illumination within  $1\frac{1}{2}$  in. of the plate measured perpendicular to the plane of the plate at the edge farthest from the light source.

The figures or letters as well as the colors of the background and of the figures should be standardized by the various states so as to permit the practical application of the law that the plate must be legible at a distance of about 60 ft. The specifications provide for size and spacing of figures and letters and recommended a high contrast between colors of plate and figures.

A specification for internal-combustion engine lubricating oil was adopted. This covers ten different grades of petroleum oil, but does not include compounded lubricating oils containing products other than those derived from petroleum. The list includes two light grades, two medium grades, two heavy grades, and four extra-heavy grades. For each grade a flash point, fire point, viscosity at 100 and 210 deg. F. are given. Other laboratory tests are also defined.

### PROCEEDINGS AT BODY SESSION

Two meetings devoted to body engineering were held during the S.A.E. meeting. At the first L. Valentine Pulsifer talked about the qualities required for successful finishing varnish, and Frederick F. Murry about the needless waste of hardwood lumber. At the second session two papers were presented on methods of reducing the cost of inclosed bodies. While these referred primarily to the pleasure-car body produced in large quantities, the use for bus bodies was discussed.



BUS TRANSPORTATION's booth at New York Body Exposition

of door-operating mechanism. There were many displays of upholstery fabrics, decks coverings, curtain materials, as well as full and imitation leather.

The Automobile Body Builders' Association held its annual meeting during the Body Builders' Exposition. John C. Howell of the Brook-

spark-plug shells were revised by the recommendation of four types (threaded, ball, slip, and post) of terminals. On the small plug now standardized the dimensions across the flat of the hexagonal head has been increased  $\frac{1}{8}$  in. so as to give sufficient wall to stand up under wrench strain, especially in two-piece construction.

In connection with automobile light-



George Mercer, Model Body Corporation, Detroit, announced a new type of closed body. This consists of the conventional hardwood frame with galvanized wire netting tacked across it. Next is a covering of three-ply buckram and outside a new type of fabric known as Meritas, and developed by the Standard Textile Products Company. It is said that this panel construction, which replaces metal panels weighing about 14 lb. per square foot, itself weighs less than 1 lb. per square foot. The outside material, or Meritas, is black and shiny and resembles leather in appearance. It is claimed for this that dust, grease and mud will not mar the surface, and that it will not expand or contract under variations in temperature. In case of damage it is an easy matter to substitute a new prefabricated panel.

#### AUTOMOBILE FINISHING VARNISH

The qualities required of a successful automobile finishing-varnish were described by L. Valentine Pulsifer, chief chemist Valentine & Company, New York. Mr. Pulsifer's paper dealt with the qualities required by the paint shop in applying the varnish, and also those needed in service on the vehicle. Extended directions were given for tests to check the required qualities.

Before deciding just what service qualities are required, the causes of the final breakdown that comes eventually to all varnishes must be understood. The most important of these is the chemical action of the sun's rays. This results in a slow breakdown of the vegetable compound in the dried film of varnish. It also promotes progressive oxidation or "rotting," and causes a gradual loss of elasticity. When this elasticity is reduced below that necessary to withstand expansion and contraction of the surface underneath and of vibration due to operation of the vehicle, then small cracks appear and final breakdown is near at hand.

To postpone final breakdown varnish should possess as great an initial elasticity, as high a resistance to the destructive chemical effect of moisture, and as thick a dried film as are permitted by the method of application and the time schedule.

#### PROGRESS IN FUEL RESEARCH

Reports were presented by representatives of the Bureau of Standards and the Society of Automotive Engineers on their study of automobile fuels. A general research program is being undertaken jointly by the automotive and petroleum industries to find an answer to the question, What grade of fuel will afford the maximum mileage per barrel of crude oil consumed in its production? Tests have been made in Washington by the Bureau of Standards and by a number of different automobile manufacturers under the supervision of the Society of Automotive Engineers with four grades of fuel, varying from a light gasoline with an end-point of about 400 deg. F.

to a heavy fuel which does not break off until about 500 deg. F. The general result of the tests of the different fuels indicates that the average passenger car gives about the same mileage with any of them in warm weather. It appeared that octane and oil dilution increased with a decrease in volatility of the fuel. It has therefore been decided to carry on the test during winter months. The Bureau of Standards will make engine tests in a special altitude laboratory developed at Washington for aircraft work. The road tests by the various manufacturers will also be continued under winter conditions. It is hoped that in the end these research studies will develop accurate information so that it will be possible to draw up specifications for fuel to suit both the refiners and the engineers.

In a paper presented by C. S. Kegerreis and G. A. Young of Purdue University Engineering Experiment Station improper carburetion was blamed for the great waste in the use of fuel.

Formerly, satisfactory performance of motor vehicles was easily obtained by the use of volatile fuels; the cost of the fuel was low, so economy was of minor importance. Economy is now growing to be considered as essential as power. Even with power alone concerned, too much trouble is experienced from carbon deposits, oil dilution, and cost of service and replacement due to rich mixtures used.

The use of higher compressions in present engines will improve economy wonderfully, but just the same the loss due to improper mixture preparation must be eliminated. It is estimated that the loss of fuel in 1921 alone amounted to about 25 per cent of the gasoline consumed, this being wasted on account of improper carburetion and consequently poor combustion.

The causes of the high fuel waste due directly to the carburetor are (a) improper mixture ratios, (b) poor acceleration, (c) omission of temperature control, and (d) high fluid frictional loss. From the standpoint of the motoring public, and from an economic viewpoint, carburetion in present-day equipment is far behind the other component parts of the engine. More effort is being extended each year on carburetion development, and the day is at hand when the United States must utilize more than 75 per cent of its annual consumption of gasoline.

#### PAPERS AT DETONATION SECTION

Representatives of the United States Bureau of Standards, Purdue University Engineering Experiment Station and the General Motors Research Corporation presented papers showing what is being done to prevent "knock" in automotive engines and to increase the economy of present fuels.

From the Bureau of Standards, Stephen M. Lee and Stanwood W. Sparrow discussed tests of fuel for high compression engines. Using gasoline,

the effect of temperature, pressure, and octane value on the detonation characteristics of the fuel was studied. It was found that the effect of temperature and pressure on the detonation characteristics of the fuel was not as great as that of octane value. The effect of octane value on the detonation characteristics of the fuel was found to be the most important factor in determining the detonation characteristics of the fuel.

Neohexane, a high octane fuel, appeared to be the best fuel for use in a high compression engine. It was found that the effect of octane value on the detonation characteristics of the fuel was the most important factor in determining the detonation characteristics of the fuel.

#### NATURAL LAWS CONTROL KNOCKING

Thomas Madgley, Jr., and Robert Janeway, of the General Motors Research Corporation, Dayton, Ohio, asserted that certain incontrovertible and well-understood natural laws are responsible for gaseous detonation. After summarizing the theory of detonation in explosion tubes and other laboratory apparatus, results were given of experimental work on a one-cylinder Decca-Light plant using kerosene as fuel. These experiments were conducted to show how the critical pressure at which detonation takes place may be determined for any given engine.

## Motor Transport and Our Railroads—A Problem in Co-ordination\*

BY ELSHA LEE

Asst. Prof. of Transportation Railroad System

IN DISCUSSING the relationship of motor transport to the railroad, we necessarily have in mind the future possibilities for the further development of motor vehicles in the field of transportation for hire. I, of course, share the realization of railroad officers, generally, that this activity, although already of important scope, is still in a state of comparative infancy and is entering upon what should be a period of lusty and vigorous growth. Nevertheless, the resulting problems, as relating to the railroads, will not, except in secondary degree, be those of competition, but will chiefly be those of co-ordination.

For holding these views, I have a very simple reason. Such profit as the railroads are able to make at all come practically altogether from the mass transportation of freight and passengers over at least considerable distances—in other words, from what we may term the "wholesale" department of transportation. This is just the form of service in which experience shows that trucks cannot consistently

\*Abstract of address given Jan. 11, 1923, before American Institute of Automotive Engineers, New York.

earn real profits. On the other hand, those forms in which trucks can and do make money are almost invariably the strictly "retail" forms in the rendering of which railroad operation practically always involves losses, and sometimes very heavy ones.

The demands of modern large-scale industry for a constantly increasing volume of mass transportation are irresistibly compelling the railroads to adapt their motive power, cars, structures, terminals and operating methods more and more to the "wholesale" forms of service and, inevitably, less and less to the "retail" forms. That thought supplies the keynote for any sound consideration of the economic co-ordination of rail and motor transport.

#### WASTED COMPETITION

The question of competition in reality seems seriously important from only one point of view, and that is to enlist the assistance of the leaders in the automotive industries in discouraging futile attempts at losing forms of competition. Such experiments are harmful in two ways. They reduce railroad earnings while they last, and waste and dissipate the energies of truck operators which might be utilized in productive channels.

I am satisfied that the railroads and their patrons urgently need the co-operative services of both motor trucks and motor passenger lines, and can therefore ill afford to see these forms of enterprise go to waste in fruitless and needless efforts at competition with transportation agencies which are already functioning successfully.

Outside the large cities, much interest in the co-ordination of rail and motor facilities centers upon the possibilities of extending the use of motor trucks as lateral feeders to the railroads, thus placing the farm products of vast fertile, but sparsely settled, territories in better communication with railroad lines. We may as well face the fact that any very early realization of such hopes, upon any considerable scale, will necessitate a change in the policies now chiefly dictating the building of our hard surfaced highways.

There seem to be a positive mania today for building long-distance automobile and motor truck roads, whereas the more urgent need is probably for shorter distance lateral highways, bringing the more remote villages and countryside into better communication with the larger towns and railroad centers. But just now no one seems to be much interested in a road project unless it is advertised to run from ocean to ocean or lakes to gulf, or to create some other new and striking long red line on the touring maps. That appeals to the imagination, but it is very doubtful whether it constitutes, in the majority of cases, the best expenditure of the taxpayers' money.

This same policy also has an important bearing upon the possibilities of extending motor bus service for pas-

sengers into the territories not already served by railroads or by interurban electric lines. Our new highways, inviting motor travel, are not being built in those directions for the most part. Instead, thousands of miles of concrete and other expensive roadways have been built, and are under construction, paralleling the lines of the trunk-line railroads. These highways are the great routes of the longer distance motor buses. Their coming does not assist in giving transportation service to people who previously had none.

To make matters worse, in many cases, especially in the Central West, the rail lines had already been paralleled, years ago, by interurban trolleys, so that the advent of the concrete road, and its bus lines, often simply provides a third agency of transportation where one would suffice. Thus, with a serious shortage of transportation for the country as a whole, we are confronted with a remarkable excess of facilities in certain instances.

A very striking case which came to my notice, because it developed in Pennsylvania Railroad territory, involves a town of about 40,000 inhabitants, located 31 miles from a Middle Western city of some 400,000 people. The size of the populations and the comparatively long distance between the points make it evident that the volume of traffic could not be extremely heavy. Yet an investigation showed that, analyzing the service in one direction only, there are eighty-six regularly scheduled movements of passenger vehicles daily, including steam trains on two railroads, cars and trains on the electric lines, and a number of bus lines on the public highway. I don't suppose any of them are making, or possibly can make, money under such conditions. The railroads, if consulting their own interests only, would abandon their passenger trains at once between those points.

#### REQUIREMENTS FOR RAIL CARS

I have been requested to discuss the adaptability of motor-driven rail cars for passenger service on existing branch railroad lines of light traffic. The real answer to this lies in the hands of the automotive engineers themselves. The railroad with which I am associated is carefully studying every new design brought out, as are many of the other roads also. But thus far the type has not been produced which we can regard as fully and satisfactorily solving the problem. However, we are proceeding to give a practical tryout to a number of cars of the most promising type yet produced and other lines are following a similar course.

I can give briefly the specifications of what the successful gasoline rail car must, from the railroad manager's viewpoint, be and do to meet with reasonable completeness the needs of light branch-line traffic. It must be capable of carrying seventy to eighty or more passengers, with suitable baggage, mail and express space. It must be capable

of a sustained speed on level track or ordinary grades of at least 40 m.p.h. It must be reversible and capable of operation from either end. It is needless for me to say that the problem resolves itself largely into the designing of a motor of sufficient power—probably at least 100 hp.—with the necessary mechanical and electrical equipment that will allow control from either end and movement in either direction. That problem is in the hands of your profession. I have no doubt that it will be solved.

There is just one more subject upon which I would like to touch, and that is the question as to the limits of distance within which the motor truck, instead of acting jointly with the railroad, may be regarded as fitted to take over merchandise freight service in its entirety. In my opinion all freight service within the city and highly developed suburban areas should be performed entirely by truck, except those special cases involving single pieces of such great weight as to necessitate the use of railroad equipment and roadbed. Otherwise, the railroads ought to be relieved altogether of intracity business, so that the tracks within the municipal areas may be reserved entirely for the purposes for which they were constructed, namely, the rendering of the strictly terminal service required in connection with the line hauls.

#### MOTOR VEHICLE LIMITS

Similarly, with passenger traffic, where there is not enough to support both rail and bus lines, does it not seem proper to determine which form of service shall be continued within specified zones and which shall withdraw? When the people permit the building of hard surface roads directly paralleling the established rail lines, and then permit and encourage the operation on these highways of bus lines, paying nothing for their roadway, and to such an extent that the revenues of accommodation passenger trains do not cover half the cost of operation, does it seem fair that the people of those communities ought to insist upon the continued running of the trains? Does it not seem fair to call upon them to decide which form of service they desire, and abandon the other, especially when the railroads were being subjected to constantly increased taxation to help build such highways? That is a situation which railroads are facing in different parts of the country, and it will invariably have the result of bringing about a movement for a general reduction in passenger accommodation trains.

The spirit in which all of our problems of co-ordination ought to be approached should be one of live and let live. For both the men in your occupation and mine, the primary purpose should be to guide the development of that relationship along sane and sensible lines, so that each form of transportation may be enabled to give to humanity the maximum service of which it is capable.

## Automobile Commodities in 1923\*

By JOHN C. HOWELL,

Business Economic Service, Inc.  
New York, N. Y.

**I**N ESTIMATING the probable movements of particular commodities that are of automobile interest I have selected the iron and steel group, lumber, rubber, cotton, paints, varnishes and glass. All basic raw materials will move in the same general direction unless there be some particular features in a given commodity that might tend to prevent this movement or to change its direction. In considering iron and steel, first, the principal point to stress is the low production of 1921, low not only relatively but actually—relatively as against the previous ten-year average and actually as against what may be called normal requirements.

The total amount of pig iron produced in 1921 was 16,506,000 tons, which compares with 28,472,000 tons average 1907-1914 inclusive. Production for 1922 is about 27,000,000 tons. This is below the country's normal requirements in view of the increase in population and the low production of 1921, which will have to be made up. Figuring on a 5 per cent rate of normal growth, the country's requirements for next year in pig iron should range between 32,000,000 and 35,000,000 tons. The per capita rate of production in 1921 is given as 271 lb., which is the lowest since 1894. The average for the last twenty-eight years, 1894-1921 inclusive, has amounted to 539 lb.

The great consuming channels for iron and steel are, in order of importance, railroads and equipment, 17.13 per cent; building, 14.23 per cent; export, 13.43 per cent; automotive industries, 9.82 per cent; oil and gas works, 7.75 per cent; machinery and tools, 4.46 per cent; agricultural, 3.59 per cent; food containers, 3.12 per cent, and all other, 26.36 per cent. It is my judgment that during the coming year all of these channels of consumption will be actively in the market for iron and steel fully up to these percentages, with the possible exception of exports, but the probable demands of the other groups will more than compensate for the falling off which may develop in exports. Prices as a consequence of increased demand will tend to higher levels. This despite the fact that present prices of pig iron and steel are considerably above the pre-war level and the low of 1921.

### CONDITIONS IN THE RAW MATERIALS MARKETS

While it is true that the principal source of demand for lumber is building, the general industrial situation is such as to indicate an increasing demand for lumber for many industrial uses during the spring. The principal channels of consumption for hardwoods are flooring

manufacturers, box manufacturers, furniture manufacturers, and sash, door and blind manufacturers. These four channels consume around 60 per cent of the total hardwoods produced. While the wave of demand for the next few weeks may be away from building, a practical certainty exists that during the spring a revived demand of large proportion will be witnessed. The outlook would seem to be that with all channels of demand active, the prices of lumber, both hard and soft, because of more active demand, will tend to harden as the spring progresses.

### RUBBER RALLIES RECENTLY

Rubber is a notable example of how a commodity will follow an opposite trend to the general markets when overproduced, even in periods of rapidly rising prices. While practically everything else was rising during the war, rubber continuously and consistently declined. This was due wholly to factors within the industry which made it impossible to restrict production more nearly equal to demand, and large surplus stocks accumulated not only in primary markets but in the great consuming countries.

A reflection of the extreme depression in raw rubber is indicated by the radical decline which took place in prices. Plantation rubber, smoked ribbed sheets, in 1912 averaged \$1.21. Through the succeeding years prices fell steadily, reaching the low in September of last year at 14.25 cents. Para rubber in 1912 reached \$2.04. This, however, was due to a speculative boom rather than in strict accordance with fundamentals, and since that time a steady decline has taken place, terminating in July of last year at 16.5 cents. The recent rally in the rubber markets was due mainly to a partial valorization which brought about heavier buying from consuming interests and more speculation. In smoked ribbed sheets the price reached 28 cents and Para 29 cents. The United States consumes about 75 per cent of the world's production of rubber, of which about 70 per cent is consumed in tires and tubes, 14 per cent in mechanical rubber goods, 8 per cent in boots and shoes, and the balance in miscellaneous items.

Cotton, due to its statistical strength, fits into the fundamental business situation. The world's supply for the current year cannot be more than 25,000,000 to 26,000,000 bales. Under normal conditions, the world's consumption ran as high as 21,000,000 bales. While from present indications it does not seem that this amount of cotton will be consumed during the current year, it will closely approximate 20,000,000 bales. This will leave next year a relatively small world carry-over. The outlook in cotton may be summarized under the following points, which make for the maintenance of a strong tone in cotton for the coming spring: The relatively low supply as against normal requirements; the high rate of domestic consumption as indicative of healthy and high demand; the

low carry-over; the fact that the production of 1922 is only about 10 per cent above the 1921 world total; and the fact that the carry-over of 1922 is only about 10 per cent above the 1921 carry-over. While it operates to keep the market generally steady, the carry-over is not so large as to subject the market to wide fluctuations through speculative activity.

During the coming year the market is likely to be subjected to speculative activity or so long at least as the seasonal conditions or a new and larger crop is gathered. The cumulative force of these factors in the cotton market is distinctly bullish, both on the raw material and the products. While in accordance with seasonal tendencies there may be some reaction during January, the certainty of a better spring demand should carry prices well above the present level and perhaps above the record high level.

### PAINT ADVANCES MODERATE

The paint and varnish industry had a record-breaking year in 1922 and starts 1923 with a very bright outlook due to a very active demand both for new and old building work. Prices held steady during the year and are now about 72 per cent higher than the average of 1914. Primary paint materials show about the same relations. The outlook for demand is good and the certainty of strength in turpentine may be offset to some extent by the statistical weakness in linseed oil. Consumption, however, will be on a large scale both for paints and varnishes during early 1923 but prices for finished products should show only moderate advances.

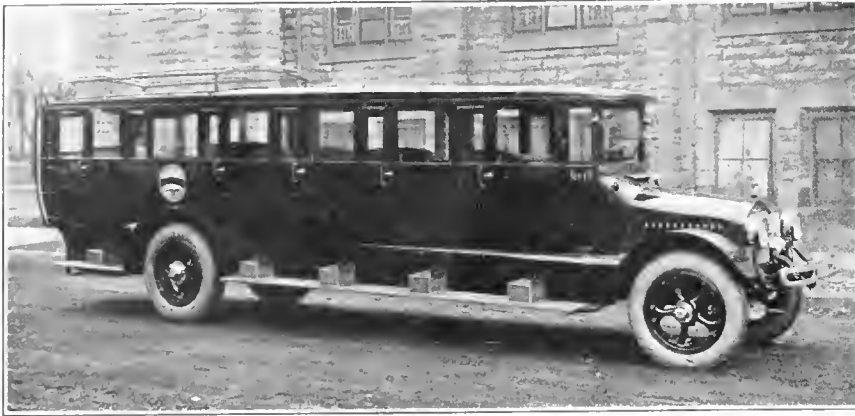
The demand for glass has been so great during the past year that the capacity of the country has been extended and consumption has kept pace pretty closely with production, especially so during the last six to nine months. The extensive building program and the greater demand for furniture and more closed cars, the latter certain to increase during the spring, is very likely to strengthen the glass markets during the early part of the current year.

I consider leather for spring requirements a good purchase. These markets have had a notable rise recently but are still well below the general level of prices. Advances of leather consumption should be very active through the spring and the tendency of prices on leather is towards higher levels.

In the case of the automobile industry, the controlling fundamental, the particular commodity, a growing general demand, abating general prices, exceptionally healthy credit conditions, a large volume of purchasing power, a favorable buying public attitude and the God-given desire on the part of our people to live better, own more and enjoy life all combine to indicate expanding business for the first half of 1923.

\*Abstract of address given Jan. 11, 1923, at annual meeting Auto Body Builders' Association, New York.

## Five-Compartment Bus Serves Minneapolis Territory



*Mack limousine-type bus on Minneapolis (Minn.) line. Little boxes along running board are auxiliary steps*

THE De Luxe Line, Inc., of which J. H. Maylone is president, is running two twenty-passenger buses from the Majestic Hotel, Minneapolis, to St. Cloud, Minn., 70 miles to the northwest. It is planned to extend this service 70 miles to Brainerd, Minn., the next large town. A third bus somewhat improved in appearance over the present type will be put into service early in 1923.

As the photograph shows, these buses are of the limousine type. The cost is \$11,000 each. Access to the interior is through five side doors, into separate compartments, each carrying three passengers, except

the one in the rear, which is used for smokers and carries nine passengers. Baggage is carried in a wire mesh rack on the roof at the rear.

The chassis, which is a Mack hook-and-ladder design, has a wheelbase of 232 in., so that the body is 30 ft. long over all. Loaded, the total weight is 6 tons. The fuel tank holds 29 gal. Wheels are of the wooden artillery type, with 36 x 6 front and 40 x 8 rear pneumatic tires. Two extra tires, one at each side, are carried on a rack at the rear.

The limousine-type body was built

by Eckland Brothers Company, Minneapolis. Mohair velour is used for the four front compartments, all of which have seats extending across the body. The smoking compartment, which is finished in tan leather, has seats on three sides of a square. In each seat is an overhead electric light and push buttons to signal the driver. The floor is carpeted in gray.

Entrance is gained by a running board extending the full length on the right-hand side and by auxiliary steps placed at each of the wide doors. The compartments have individual ventilators which can be controlled by the passengers. In each one is a register for heating, this being directly connected with the jacket above the exhaust pipe. The plate-glass windows are operated by a crank-type regulator.

The present schedule provides for two round trips each day, or a daily mileage of 280. The buses start from each end at 8 o'clock in the morning and at 12 noon, 3 and 6 p.m. The trip is made in two and a half hours, the one-way fare being \$2.25, with rates of 35 cents and up for the seven stops between St. Cloud and Minneapolis.

Two forms of schedules are issued by the company, both being printed in black and red ink. The large schedule, suitable for posting in hotels, waiting rooms, etc., is on 9½ x 11 cardboard sheets. Then there is a card of pocket size, 2½ x 5½ in., which gives on one side schedule information and list of ticket agencies, and on the other an invitation to passengers to report any discourtesies. Two of the driver's forms are here reproduced. The operator's trip report, which measures 3½ x 7½ in., is printed on the front of an envelope, in which can be inclosed small reports or other matter for the office. An example is the accident report, printed on 3½ x 5½ cardboard. Only one side of this is reproduced; the other has spaces for names and addresses of witnesses and for a description of the cause of any accident.

### The DeLuxe Line, Inc.

#### Operators Trip Report

Bus No.	Date
Trip No.	Tickets
Cash	Gas
Tire Changed—Yes	No
Name of Tire Taken off	
Number of Tire Taken off	
Name of Tire Put on	
Number of Tire Put on	

#### REMARKS

Note if late leaving or arriving and cause

CAR NO. \_\_\_\_\_

#### The De-Luxe Line Accident Report PERSONAL INJURY AND PROPERTY DAMAGE

Date of Accident	_____ 192__
Hour	_____ A.M. _____ P.M.
Where Accident occurred	
Street	City & State
Make of Car	Car No.
License No.	
Name of driver	Address
Date	Signed
Names and Addresses of Occupants	

Describe Cause of Accident Fully On Back of This Report

*Forms for drivers' reports. At left, trip report printed on front of envelope. At right, accident report, on the back of which are spaces for names of witnesses and cause of accident*

### Bus Operation in Newark

A recent survey of traffic conditions in Newark, N. J., brought out the fact that between 8 a.m. and 6 p.m. a total of 4,200 buses passed the intersection of Broad and Market Streets, Newark's busiest corner.

# Trend of Proposed Legislation

**Gasoline Tax Advocated in Many States—Tendency Toward Increased Taxation and More Extensive Regulation Evident—Recommendations of Interest to Bus Industry in Governors' Messages and in Public Utility Commission Reports—Pending Legislation Digested**

**A**T THE time this is written the legislatures of forty-three states are in session. In these sessions, with few if any exceptions, there has been recommended and there is being drafted legislation affecting directly or indirectly the business of every bus operator. As an index to the general trend of this legislation, the accompanying symposium has been made up from some of the recommendations contained in the messages of governors and from reports of utility bodies to the various legislatures in addition to legislation already introduced. Putting aside for the moment the character of the proposed legislation, one significant fact clearly stands out. Virtually every governor and many public utility commissions have taken official cognizance of the motor bus as a most important factor in the transportation scheme of the country.

## TAXATION

Motor vehicle taxation was touched upon in the majority of the recommendations embodied in governors' messages, from which the following extracts are quoted:

**Colorado.**—The subject of licensing motor vehicles and fixing the amount of the fees is one that should engage the attention of the Legislature. Transportation by truck has grown to very large proportions and is bound to increase. Wear and tear on the roads by reason of such transportation is very great; I recommend, therefore, that a tax be imposed on trucks carrying freight which shall bear some relation to the extra cost of construction, upkeep and repair of our highways made necessary by the use of auto trucks. Colorado auto license on pleasure vehicles is the lowest of any state in the Union. I recommend that our license fees be increased to equal the average fee charged for like cars in other states.

**Idaho.**—Highways have heretofore been built by all the taxpayers, but our roads should be maintained by those who use them, including tourists; and this can be accomplished by gasoline tax.

**Illinois.**—In my opinion, any legislation revising the present scale of motor fees at this time should be directed not at the average passenger vehicle, but more equitably toward the heavy truck, inasmuch as a very substantial part of the cost of pavements is due to

the necessity of providing pavement capable of supporting truck loads.

**Indiana.**—Another important thing to be taken up at this time is the placing of a just and equitable tax on gasoline used for motor driven conveyances. It is not fair for the construction and maintenance of our highways to be supported by a general property tax when the benefit accrues largely to those who own and operate motor vehicles.

A tax on gasoline would distribute this expense in accordance with the mileage negotiated as determined by the amount of gasoline consumed. It would also enable us to secure some support for road maintenance from tourists and transient cars and trucks which now escape any payment for the road privileges afforded them.

Indiana license fees on motor cars and trucks are among the lowest of any state in the Union. No owner of a car or truck should complain over a raise in license fee when they know that the money produced will go toward construction, repair or maintenance of the highways. I respectfully ask that the license fees on motor cars, trucks and buses be increased, and leave it to your discretion to say how much advance should be made.

**Kansas.**—I recommend the enactment of a law that will make the valuation fixed or claimed by public utilities or others doing business in this state, for rate-making or profit-making purposes automatically the basis for assessment and taxation.

**Massachusetts.**—As an equitable method of producing the increased funds necessary, I recommend a tax upon gasoline and other fuel used in propelling motor vehicles. . . . The amount of gasoline consumed bears a very direct proportion to the use and wear and tear upon the roads. . . . The Webster Commission recommended a tax of 2 cents per gallon upon gasoline and other motor vehicle fuel brought into the state or manufactured herein to be collected by the tax commissioner from the wholesale distributors, who would pass it along to the motor vehicle owners. . . . I would recommend that the commonwealth keep 50 per cent and return to the cities and towns 50 per cent of the tax so collected. . . . The additional mileage per gallon of gasoline to be obtained upon good roads might in large measure offset the burden of the additional tax.

**Nebraska.**—Public utilities and common carriers should be taxed on their rate-making valuation. A sales tax is a tax on consumption and is another plan for transferring the taxes from the rich to the poor, and I strongly urge you to oppose a tax on gasoline or any other kind of a sales tax.

**Nevada.**—I herewith recommend for your consideration:

The enactment of a gasoline tax

now in process, to a tax of 2 cents per gallon on all gasoline used in the state, the amount for such tax to be placed in the state highway fund to be used for maintenance and reconstruction of the highway. . . . Such legislation as is required to fix a higher license fee to trucks and transportation lines using highways as common carriers.

**New York.**—It has not been demonstrated to my satisfaction that highways should be built from the proceeds of bond issues.

In any circumstances they are of so temporary a nature that the cost of building and maintaining them should be met from the current revenues of the state.

**North Dakota.**—I would also urge upon you the adoption of laws and needed constitutional amendments which will devote to this . . . trunk line system of good roads in our state the license money from motor vehicles of every kind and the money realized by a tax on motor fuel.

**Oregon.**—It is but just that a fair return in the way of compensation for the actual cost of supervising their affairs should be paid by the utilities in the state treasury, thus relieving the general taxpayers of what is otherwise a large burden. Indeed, the time will come . . . when all public service corporations will be taxed upon their gross earnings, rather than upon their general property, as is done in California and other progressive states.

I would also recommend that the old quarter mill road tax be retained for the road funds, that the tax on gasoline be increased and that any adjustments that may be made in the present automobile laws do not reduce revenue. If any changes are made in the license law I recommend that the fees on high-priced cars be increased.

**South Dakota.**—The state taking over the maintenance of roads constructed means an additional expenditure of money, and this additional revenue must be raised in some manner by the present Legislature. Your automobile tax at the present time, including the amounts derived from the gasoline tax, is only sufficient to take care of the regular federal and program in this state.

I, therefore, urge upon you the necessity of early action in complying with the provision of the federal law in reference to maintenance of highways.

**Utah.**—We have many millions invested in highways. These must be maintained and protected. The only source of income is the present motor vehicle law. This, because of its restrictions and excess levies, has become exceedingly obnoxious. Yet the proceeds in the future will be barely enough to pay the annual interest on sinking funds and road bonds. Only



one other means of meeting this dilemma seems available. By scaling the schedules down and levying some form of gasoline tax it can be solved.

*Vermont.*—The auto tax law should be thoroughly revised, and favorable consideration may well be given to the Connecticut law, which is based on piston displacement and therefore seems much more closely to represent the power of the car in relation to its wear and tear on the roads. Weight is perhaps a more fair basis for taxation than our present methods. A scheme based substantially upon weight is worthy of consideration. . . . In this connection I would also suggest for your consideration a 1-cent per gallon gasoline tax to be collected on the wholesale basis.

*Washington.*—At a conference of governors of states west of the Rocky Mountains, called for the purpose of establishing uniformity of laws and regulations affecting the automobile traveling public, it was decided to recommend to the legislature of each state a tax of 2 cents per gallon on gasoline, the proceeds to be used exclusively for construction and maintenance of highways. I recommend such an increase in our gasoline tax. The present gasoline tax law is working very satisfactorily and there should be no amendment to the general policy, except to change the rate of tax to be collected.

I recommend that a gross earning tax be charged auto buses and auto trucks used as public utilities.

*Wisconsin.*—I recommend that the present automobile license law be revised and that there be established a graduated license fee, based upon those elements that have a direct relationship of the use of the highway to the highway, namely, the weight and cylinder displacements.

The Mayors' Conference, an official organization composed of mayors of various cities of the state of New York, at a convention held at Albany on Jan. 5, made the following recommendation:

We urge the Legislature to enact a law placing a tax on gasoline and to return three-fourths of the revenue therefrom to the localities, to be used exclusively for the construction and maintenance of highways, and for the regulation of traffic.

From report of the Department of Public Utilities on Investigation of Transportation Facilities Within the Boston Metropolitan District to the Massachusetts Legislature:

We think that as long as street railways and steam railroads pay for subways, tunnels, elevated structures, tracks, etc., other vehicles, especially automobiles, ought to pay a fair sum for the use which they make of the highways.

The following bills with reference to taxation have been introduced in the legislatures of these states:

*Massachusetts.*—Senate Bill No. 27, introduced on Jan. 8 by Senator McCormack to accompany petition of M. A. O'Brien, Jr., provides that in addition to the taxes now provided for by law, every dealer now engaged or who may

hereafter engage in the sale or distribution of gasoline, shall render not later than the fifteenth day of each calendar month a statement of the gasoline sold or distributed during the preceding month and pay a license tax of 1 cent per gallon on all gasoline so sold or distributed. This bill carries the provision that said license tax shall not be imposed on gasoline when sold for exportation from the state of Massachusetts to any other state or nation, or when sold to the government of the United States or its agencies.

*Missouri.*—House Bill No. 93, introduced on Jan. 11 by Mr. McGregor, is an act "to provide a license tax on motor vehicle fuels, purchased for use in motor vehicles, operated or intended to be operated upon the public road and highways of the state of Missouri."

*New Jersey.*—Senate Bill No. 20, introduced on Jan. 10 by Senator LeFever, is an act "providing for an excise tax of 1 cent on gasoline at retail, proceeds to be divided equally between county road funds and municipalities or townships."

Senate Bill No. S-103, introduced on Jan. 15 by Senator Richards, "places a tax of 1 cent per gallon on gasoline." Referred to the committee on highways.

*New Hampshire.*—House Bill No. 24, introduced on Jan. 11 by Representative Smith, is an act "providing for an excise tax of 2 cents per gallon for the purpose of doing business in the sale of gasoline and other products used in the propelling of motor vehicles and motor boats." Referred to the committee on ways and means.

*West Virginia.*—House Bill No. 4, introduced on Jan. 11 by Representative Moore, is an act "raising additional public revenues by annual license tax upon the business of producing coal, natural gas, petroleum or crude oil." Referred to the committee on taxation and finance.

House Bill No. 14, introduced on Jan. 11 by Representative McLaughlin, is an act "imposing a state tax on gasoline and all other liquids containing any derivative of petroleum or natural gas." Referred to the committee on taxation and finance.

#### REGULATION

Recommendations regarding motor vehicle regulation were contained in the messages of the governors of the following states:

*Connecticut.*—I believe further legislation regulating not only tonnage of motor trucks, but also the dimensions of the tonneaus or bodies, is required in the interest of public safety as well as the proper maintenance of our trunk line highways.

*Illinois.*—The construction of permanent roads has encouraged a large number of persons and corporations to undertake the operation of motor bus and motor truck lines for the transportation of persons and property. The authority of the commission to deal with these companies is not adequate for the protection of the public. Therefore, it is recommended that the section of the Illinois commerce commission act dealing with this particular question be carefully and fully revised.

*Kansas.*—The development of commercial passenger and freight traffic on the public roads is of such growing im-

portance that it will be necessary for you to consider matters relating to the control of the rate charged for traffic.

*Nevada.*—The enactment of legislation properly to regulate the overloaded trucks and the narrow steel-tired wagons on our highways . . . is recommended.

*New York.*—The present Public Service Commission should be abolished and power given to the Governor to appoint not more than three commissioners to regulate such utilities as will not be regulated by the cities, either because they operate outside the corporate limits of a city, or because the city may by proper resolution, request the state to do it. . . . The state can make no mistake by selecting the elected officials of the cities to determine questions that have to do with welfare of the municipality, such as proper regulation of its public utilities. . . . I further recommend that the Transit Commission in the city of New York be abolished and all its powers with regard to laying out of routes and supervision of construction be transferred to the Board of Estimate and Apportionment, to be exercised by this body through any agency it may select. . . . In addition, by scattering all over the state the licensing and control of motor vehicles, not only has the expense been increased but the prevention of accidents by central control has been entirely lost.

*Wisconsin.*—I recommend that our laws be strengthened so as to prohibit the use of our highways by trucks or motor vehicles that unreasonably destroy our highways and involve the possibility of bankruptcy of farm and industry.

In connection with the matter of regulation in New York the Public Service Commission has had its say in its report to the Legislature for the year 1922. Sections 25 and 26 of the transportation corporation law provide for the granting by this commission of certificates of public convenience and necessity for bus lines or routes wholly or partly within the cities or villages or towns which by resolution have placed themselves under the provisions of these sections. The commission holds that it has jurisdiction over the entire length of a route or line coming within the above provisions of law, even though in many instances some portion of such route . . . lies outside of a municipality, in which local consent is acquired by law. It recommends:

The law on the subject of motor bus regulation should be stated in as careful detail as are the statutory provisions governing other carriers and utilities. . . . The attention of the Legislature is called to the subject in the belief that it is one which is constantly becoming of greater importance in many respects. The commission ventures the suggestion that the entire subject warrants careful study and investigation with a view to the early enactment of a general and comprehensive statute.

Standardization is undoubtedly necessary not only in the methods of operation but also in the type of vehicle and the appurtenances thereon which directly affect the traveling public.

Unless legislation is provided to insure effective supervision the service which the public will receive will be of a very poor character, and in fact to continue the operation of some of the lines is likely to end in serious accidents.

N. Y. Assembly Print No. 174, introduced by Henry O. Kahan on Jan. 16, amending section 282-b of the highway law, would place every person, firm, association or corporation transporting passengers and personal property in any motor vehicle in cities of the first class, for hire in the course of business, in the same category as taxicabs as requiring a bond or insurance policy in the amount of \$2,500, insuring against injury to persons or property caused in the operation or defective construction of such motor vehicle.

This bill contains a clause, making an exception of motor vehicles operated under a franchise by a corporation subject to the provisions of the public service commission law.

From report of Massachusetts Public Utility Department:

The creation of areas in congested districts from which motor vehicles should be excluded wholly or partially and the subjection of operators of motor trucks for hire to the jurisdiction of this Department to the same extent and in the same manner as other well recognized common carriers are recommended.

Municipal ownership and control was considered in the messages of these state executives:

**Kansas.**—I believe a much more satisfactory control could be had by returning to local municipalities full control over their local utilities.

**New York.**—Public utilities have become so essential to the life of our

great cities that the cities themselves should be permitted to purchase, build, own or operate them when a municipality determines this to be in its best interest. As far as transit is concerned cities should be free to adopt any sort of conveyance found suitable for their needs whether it be railroads or omnibuses.

From recommendations of Mayors' Conference—New York State:

We urge the Legislature to give to cities permission to determine issuance or non-issuance of consents or permits for the operation of bus lines in their limits. We urge the Legislature to repeal those provisions of the public service commission law which now deprive localities of the right to enforce terms of existing franchises. We urge that the Legislature approve a concurrent resolution proposing an amendment to the constitution, giving to municipalities the right to acquire, construct, own, lease and operate within or without their corporate limits any public utilities the product or service of which is or is to be supplied to the municipality or its inhabitants.

In addition the following legislation has been introduced:

N. Y. Senate Print No. 47, introduced on Jan. 9 by Mr. Lacey, adds new section 20-c General City Law so as to permit any first or second class city to investigate public utilities operated wholly or in part within its boundaries, to hear complaints against service and to enact ordinances affecting such utilities, to establish bureaus of public utilities and to investigate books thereof.

N. Y. Senate Print No. 24, introduced on Jan. 8 by Mr. Lacey, amending Buffalo charter, by permitting city to lease, purchase, own, operate and maintain bus and motor vehicle lines and to license operation of such lines by private persons or corporations.

N. Y. Senate Print No. 32, introduced on Jan. 8 by Mr. Lacey, repeals sections 1 and 2 and adds new section 25 Transportation Corporation Law, permitting cities to operate, lease, own and maintain bus lines, stage routes or motor vehicle lines, or to consent to their operation without certificates of convenience and necessity from the Public Service Commission.

The following report from reports of various public utility commissions are interesting in that they indicate the increasing prestige of the motor bus and the place which it holds in the national transportation system.

**Chicago Public Utility Commission.**—The public utility companies operating in Chicago are now faced with the imperative of the commission and are endeavoring to provide a safe and satisfactory service. The safety of operation and character of equipment have been and are now under material improvement, and the holders of certificates in nearly all cases show a commendable disposition to conform to the rules and regulations of the commission.

**Public Utility Commission of New York.**—The commission has recognized ever since it assumed office that the place of the omnibus in city transit is a valuable one, and may be expected to play an increasingly important part in it. Recognition of this fact was given in the first published outline of a plan of readjustment. As a feeder for rapid transit lines the flexibility of the bus may be utilized to a degree not possible by surface railroad lines. However this may be true as to short hauls, as the unit for long haul transportation, under urban traffic conditions, the motor bus has not yet justified itself, and in the opinion of the commission, cannot do so unless very great improvement—an improvement which cannot now be forecasted—is developed both in construction and operation. The commission has kept an open mind on the entire subject and has frequently stated its position, that, properly organized and operated, the bus may perform a real function in helping solve the city traffic problem.

**New York Public Service Commission.**—The number of applications for the granting of original certificates of public conveyance and necessity for auto bus routes is rapidly increasing. There is a constant growth of these transportation agencies, and in many instances consolidations are taking place all of which will tend in the very near future to make these lines a very imposing class of common carriers.

### Some Examples of Michigan Cross-Country Operation



Bus used by Renne's Motor Transit on Detroit-Ypsilanti route



Cross-country line, now by the Seaboard bus from Jackson to Adrian, Mich.



# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, February, 1923

## Bridge Building and Buses

**I**N A REPORT presented not long ago to the National Highway Traffic Association, an organization of users, manufacturers and, in fact, every one interested in the development of the highways, reference was made to the danger resulting from the operation of heavy motor buses over light bridges.

There is no doubt but that many bridges, especially those on the county or town roads in the different states, are not strong enough to carry modern motor vehicle traffic. It is to be questioned seriously, however, whether any great number of heavy buses is being operated over these bridges.

In some cases the highways have grown away from the bridges and the value of modern road development has been decreased considerably because of bridges of small carrying capacity. These bridges are relics of the days when a capacity of 4 tons was considered more than adequate. It is desirable that these bridges be reconstructed or rebuilt as soon as possible to carry the load for which the connecting highways are fitted.

In all this discussion of light bridges, it must be remembered, however, that there is a constant and inevitable tendency to fit the bridge to the highway as regards width and capacity. Then the lighter bridges are usually found on the more lightly traveled and poorly developed highways. Both these facts are demonstrated in the report of a legislative committee, which in 1919 studied the condition of the bridges of New York State. The figures show that about 70 per cent of the bridges on improved state or county highways are of 15-ton or more capacity. The rest of them vary, with many of 14, 10, 8-ton capacity, all sufficient for the most heavily loaded single-deck bus. Another interesting fact shown in the report is that while about 30 per cent of the total mileage of rural highway in the state is improved, this mileage contains less than 11 per cent of the number of bridges on all highways. The reason for this is probably that the main highways have a tendency to follow the rivers and other water courses, while the local roads, which of course represent the great mileage of unimproved highway, must necessarily cross rivers and brooks with more frequency.

Some seventeen states, it is reported, have established 15 tons as the minimum carrying capacity in building bridges. This weight, of course, will take care of the most abnormal bus traffic, even assuming the operation of a double decker with fifty or more passengers. Such a vehicle would never be used, under present conditions at least, on the rural highways where the bridges under discussion would be found.

As a matter of fact, this is another example of the tendency to judge the load-carrying capacity of the bus by its outside dimensions. People often fail to realize that the specific gravity or weight per unit of cubic volume of human beings is comparatively small and that this weight can be carried in only a small part of the bus body. It is this fundamental that explains why the weight per inch of tire width, or the total weight of buses, is usually less than allowed by the laws of the states where they are used.

—[ EDITORIAL ]—

## What's Behind the Stock Dividend?

**T**HE EPIDEMIC of stock dividends which broke out so virulently during the closing months of the old year continues to excite public discussion. Opinions continue to differ widely as to their purpose and effect. In view of the leading part played by the Standard Oil group in the distribution of such dividends, particular interest attaches to the vigorous defense of the policy advanced by A. C. Bedford in his recent address before the American Petroleum Institute at St. Louis.

Mr. Bedford flatly denies that stock dividends result in any tax evasion. Further, he makes a strong plea for the essential soundness of the process of building up a surplus from current earnings, plowing it back into the business and capitalizing it through the issuance of new shares to old stockholders. The issuance of the stock dividend, he insists, means merely "changing a dollar into four quarters." It creates no new wealth.

Economists and accountants generally will agree that the simple act of declaring a stock dividend creates no new wealth. They will also agree that the increase of the capital fund is essential to the progress of business and the country generally. Finally, they will admit that the stock dividend does not offer a method of tax evasion in any legal sense. However, having conceded all of these points, an honest, inquiring mind may still hunger for a deeper analysis than Mr. Bedford has made. Is there nothing more than this to the stock dividend epidemic? Is there no rational explanation for the conviction so generally prevalent that the stock dividend is significant of some condition which needs correction?

Mr. Bedford apparently accepts the orthodox definitions of wealth and income, for he argues that the stock dividend is not income because it creates no "new wealth." One has income when his wealth—his economic strength, in the sense of command over goods and services—has increased. This is the general conception of income which underlies our Federal income tax law. With this definition in mind, let us raise a few queries which may serve to clarify the issues.

Suppose you were to invest 25 cents in the Standard Oil Company of New Jersey. Suppose the company prospers and builds up a large surplus, your share of which amounts to the value of 75 cents, so that your interest in the company is now worth a dollar. Suppose the company declares a stock dividend "changing the dollar into four quarters." Has anything of significance happened? Has your economic strength increased? Have you received any income?

Clearly the stock dividend simply recognizes an existing situation. It recognizes that the quarter has expanded into a dollar and makes the convenient "change." But the significant thing is that you are ahead to the extent of 75 cents in value—not merely because of the stock dividend—but as the result of the whole process. At the beginning you had a quarter invested in productive enterprise. Now you have an investment worth, because of our assumption, a dollar.

The real nub of the matter from the tax point of view is this: The process described in the above example is about the only way you can make 75 cents and reinvest it in productive enterprise without subjecting the three new quarters to the heavy surtaxes of the Federal income tax. The corporation pays the normal tax (slightly higher, it is true, than the individual normal rate) when it adds the new quarters to surplus, but you are asked to account for them only *if* and *when* the corporation distributes them to you as a cash dividend or *if* and *when* you sell your stock at the enhanced value due to the surplus which has been built up. Thus, this "if and when" is of considerable importance.

If you had invested your original quarter in an equally prosperous individual enterprise or partnership you would have been asked not only to pay the normal tax as the new quarters were earned and reinvested, but you would also have been compelled to pay the surtaxes on them *when earned* rather than "if and when" distributed or "if and when" the stock was sold at an advance.

Clearly the corporate form of business organization has an advantage under the tax law because of this situation, and the stock dividends are advertising this advantage in a most striking manner. It is this advantage which is really the shining mark at which the "agitators" are aiming. Is it not an advantage which must in some manner be equalized if the "sturdy qualities" of individual initiative and resourcefulness, which Mr. Bedford so properly praises, are to be given full play?

How to accomplish this is, indeed, perhaps the most puzzling tax problem which the Federal government is facing. It cannot be solved by refusing to recognize its existence or by approaching it from the point of view of one industry, one form of business organization, or one economic class. The differential in favor of the corporation may conceivably be removed by increasing the burden on the corporations or by decreasing the burden on the other forms of business enterprise. The "agitators" suggest a new tax on the undistributed surplus of corporations as closely equivalent as possible to the present surtax burden on reinvested earnings of other forms of business enterprise—a suggestion

which Mr. Bedford labels "a proposal to sabotage by legislation." The fear of such a tax is probably a contributing cause, although not the one or perhaps not the most important cause of the stock dividend epidemic. The alternative plan for equalizing the corporations' differential would be to reduce the present burden upon reinvested profits of partnerships and individuals. But he who proposes this must be prepared to convince the public that a dollar of wages should be more heavily taxed than the dollar of reinvested profit. This is the dilemma.

[Continued]

### Stages and Buses—What's in a Name?

**A**S ONE travels over the United States and compares the varieties of practice in bus transportation in different sections, it is impossible to avoid the conclusion that the majority of the service along the Atlantic Seaboard is of the "bus" variety while that along the Pacific Coast is fundamentally of the "stage" variety. The Pacific Coast highway passenger salesman wants to know what is the matter with the rest of the United States, trying to call this business a "bus" business, and his Eastern brother answers back, "What is a stage—they became obsolete decades ago?" Yet there is more to this than merely a matter of name. Each has something to learn from the other—there is work for buses to do in the West and for stages in the East.

Fundamentally, a bus is a vehicle with a body, chassis and engine designed for frequent stops and frequent interchange of passengers in more or less congested areas. It is largely a city and suburban vehicle; though it is not infrequently used in the East in interurban business, where its limitations in such service are apparent or becoming apparent to the users. The bus usually has a single entrance and exit with cross-seats and center aisle.

A stage, on the other hand, being primarily for interurban long-haul business, need provide for no frequent passenger interchange; it need have no "aisle" or other facilities for moving around much inside the vehicle. As developed in the West it resembles an elongated limousine, with low chassis, powerful engine, a full-length door for each cross-seat—a high-speed, comfortable, greyhound type of vehicle. But in the West the stage is sometimes applied to service which might more adequately and efficiently be performed by buses.

Aside from these two principal types, other useful designs or modifications are also not only useful, but necessary in special cases. The parlor car stage, the limousine coach and similar productions are almost self-explanatory.

BUS TRANSPORTATION has spoken before of the necessity of considering the service requirements of bus design. There is no better object lesson for an Easterner who has an interurban problem than to go West and see the stage service. More than that, a study of the stage in the West will add possibilities of intercity stage line which the Easterner has never dreamed. And on the other hand, as the Westerner develops more business in congested areas he can learn a great deal from his "bus" brother in the East.



# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Sedan-Type Bus Carries 16 Passengers

THE Stoughton Wagon Company, Stoughton, Wis., has announced a sedan-type bus, which is highly recommended for interurban work. It will seat sixteen passengers comfortably. The chassis is the standard speed-truck design except for a somewhat longer wheelbase and heavier tire and wheel equipment. On high a speed of 35 m.p.h. is easily made.

The body shown in the photograph is 13 ft. long, 6 ft. wide and 5 ft. high; it has three doors on the right and one on the left-hand side. Three of the seats are full width, while the second one from the back is split to allow entrance for passengers to the rear seat.

The body is hand-made throughout and so constructed, it is said, as to prevent spreading or squeaking. The frame is entirely of hard wood, with sheet steel panels put over a layer of wadding to prevent rumbling.

The door openings are 30 in. wide and are of the full coach type with drop sash. The seats are 20 x 66, with 23-in. back, and have specially designed springs in both cushion and back.

The trimmings include taxi-style door locks with heavy plungers and

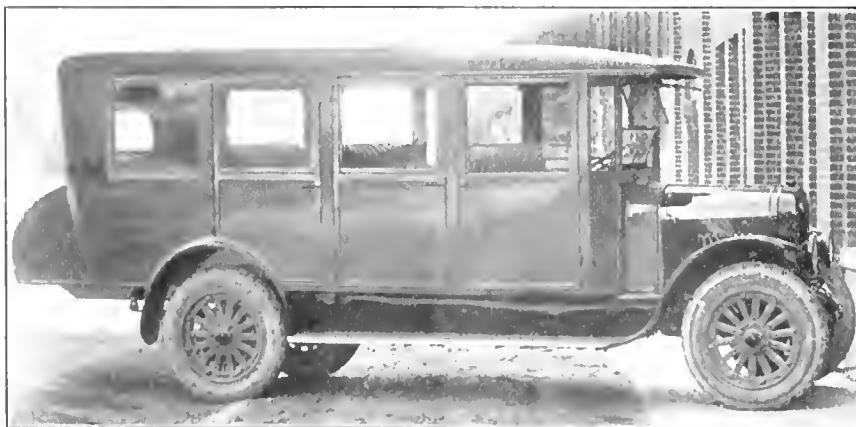
inside lever handles on the back of seats. Large-size bumpers are mounted on each door. There are grab handles on the back of the seats.

The interior is lighted by three dome fixtures, with one dome light on the top in front. Push buttons are fitted in each side post. The three-way windshield has a green glass visor. Regular equipment includes two floor heaters, full crown ventilators, and a stop light mounted at the rear.

The chassis for the sedan bus has a 152-in. wheel base, with 57½-in. gage front and 58-in. gage rear. The loading height at the forward entrance is 30 in. The chassis weight is about 2,500 lb.

The chassis details include a Midwest engine, 3½ x 5 in., Zenith carburetor, Remy battery ignition, Brown-Lipe multiple-disk clutch and three-speed transmission, Columbia front and rear axles, and Lavine steering gear. The rear axle is of the bevel gear type.

Tires are Goodyear pneumatic, 34 x 5 front and 36 x 6 rear. Complete electrical equipment is supplied, starting motor, generator with automatic cut-out, and three-cell battery of an adequate capacity. The Alemite system of lubrication is used, thermo syphon cooling, and vacuum fuel feed.



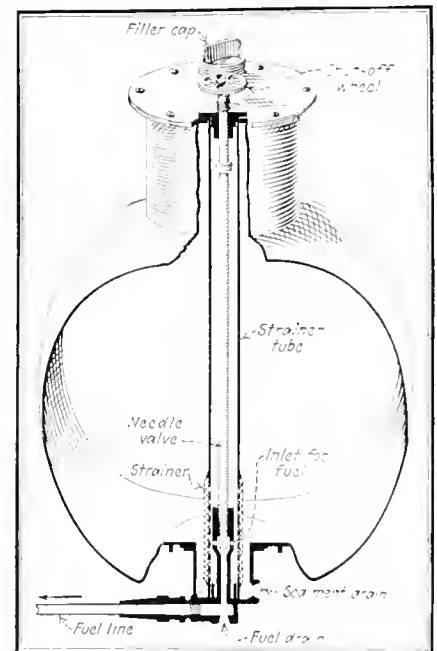
Stoughton sixteen-passenger sedan-type bus. Compartment for baggage at rear. Three doors on right-hand side, and one on left for driver

## Control for Fuel Tanks

IN MOST designs little or no thought is given to what the fuel tank must do, aside from acting as a container for the fuel. As a result, trouble is often experienced on account of leaks, splashing and plugged lines.

The Fifth Avenue Coach Company has sought to overcome the difficulty by the construction shown in the accompanying drawing. The main features of this are given as follows:

1. Valve placed where it is easy to close when the bus reaches the garage. In case of fire or other



Control and cleaning arrangements in Fifth Avenue fuel tanks.

emergency, the fuel supply can be shut off almost instantaneously.

2. Large hand hole for the removal of any accumulation of foreign matter.

3. Fine-mesh strainer of large area, which effectually reduces delays due to choked lines. This mesh is sufficiently fine, it is said, to prevent the passage of water, unless present in very large quantities.

4. Generous sediment and water trap, which eliminates the necessity of cleaning at frequent intervals.

5. Tower at filling point, which reduces to a negligible quantity the loss due to splash in gravity system.

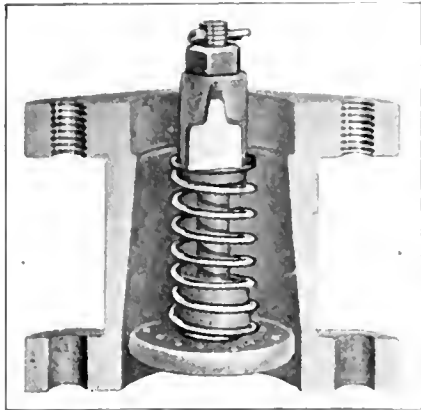
6. Tank with only one seam, thus reducing the possibility of leakage.

This construction is a recent development for use on the Fifth Avenue types A and L coaches.

## Device Used to Control Engine Speed

**T**HE McCanna governor, which is put out by E. R. Klemm of Chicago, has the advantages, it is said, of being inexpensive, easy to attach, simple and sturdy in construction, and has no adjustments that can be tampered with. This device, it is claimed, decreases the consumption of fuel, and makes a better running and more economical engine.

The governor consists of an outside frame, which can be connected



*Cross-section showing working parts of McCanna governor.*

to the manifold of the engine; a plunger with twelve small holes around its edge, and a spring, washers, nut, and cotter pin. The usual installation is made by removing the carburetor and attaching the governor between it and the intake manifold, thus dropping the carburetor by about 2 in. Fittings are supplied so that the governor can be attached in place of other types.

After leaving the carburetor, the fuel mixture passes through the small holes in the plunger. This breaks the mixture up into fine streams, and makes necessary, it is said, a leaner setting of the carburetor.

Speed is varied by changing the washer above the base of the plunger. According to the manufacturer, each additional washer means an additional mile per hour speed; the operator who adds two washers to the base of the plunger will increase the speed of his vehicle 2 m.p.h., or he can decrease the speed 1 m.p.h. for each washer removed. This is possible because of the taper given the inside of the governor. Changing the number of washers changes the position of the plunger in this tapered

portion, and thus the size of the opening through which the mixture is admitted to the cylinder. This, of course, at once varies the amount of mixture that can be admitted.

## De Luxe Bus for Interurban Service

**T**HE Selden Truck Corporation, Rochester, N. Y., has brought out a de luxe bus of the limousine type intended for suburban, interurban and long-distance sightseeing service. The chassis is the Selden Unit 31, of 160-in. wheelbase, with a Brown body seating eighteen passengers in addition to the driver. The body dimensions are as follows:

Length back of driver's seat	14 ft. 10 in.
Overall length	14 ft. 6 in.
Width inside at belt line	6 ft. 4 in.
Width over all	6 ft. 11 in.
Height over all	6 ft. 8 in.
Headroom, inside	6 ft. 1 in.

The exterior panels are 18 gageterne plate, and the roof is solid panel covered with heavy white duck. The tire carrier is under the chassis frame at the rear. Curtains, heaters, six dome lights, and collapsible luggage carrier on the rear are provided as standard equipment. Other general specifications follow:

Windshield, two-piece, slanting type, both sections adjustable, with rain shield fitted of the aluminum-visor type.

Windows and doors are equipped with mechanical lifts operated with crank. The three windows in the rear and two windows on the side are stationary.

There are four doors on each side,

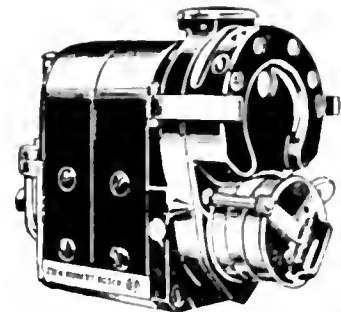
those at front 24 in. wide, and others 28 in. wide, with American plate glass throughout, except windows and windshield.

Ventilators, two, Natchez lantern of bus type, mounted along center line of bus roof.

Upholstering, Spaulding leather throughout.

## Magneto Combined with Distributor

**T**HE magneto shown in the illustration is the Type "Z1-4," made by the Robert Bosch Magneto Company, Inc., New York. It is designed to be driven at crank-shaft speed, and is carried on ball bearings. The distributor is placed on



*Magneto for engines up to 4½-in. bore.*

the magneto itself, which is recommended for engines not exceeding 1 or 4½-in. bore. If desired, impulse couplings can be furnished. The weight of the complete magneto is 14 lb. Because of the completely inclosed construction the magneto is said to be entirely water and dust-proof.

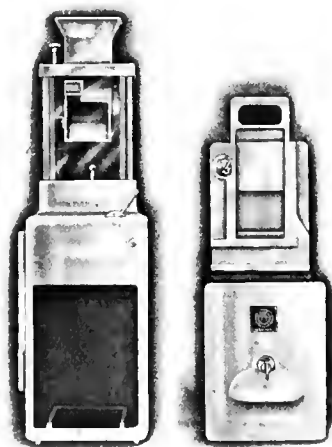


*Selden sedan-type bus—with Brown eight-passenger body*

## The Springfield Fare Box

THE fare box here illustrated is a new design of the locked type, made by the Springfield Change Making Register Company, Springfield, Mass., and embodies a number of improvements. These features have been developed by men with sixteen years of experience in the operating and traffic departments of the Springfield Street Railway system, and have been worked out, it is said, to overcome defects in present boxes now in use.

The outside casing or body of the box is a single casing of aluminum alloy of 30,000 lb. per square inch tensile strength. This construction reduces the weight to the lowest amount consistent with strength, and eliminates all riveted or bolted joints.



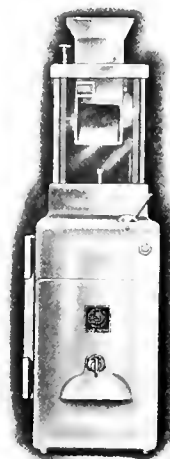
*Taken-down views of Springfield fare box.*

Above the casing is a plate-glass receiving chamber constructed without corner members. The receiving hopper, also a casing of aluminum alloy, forms the top of the receiving chamber. This hopper has a large, free passage admitting tickets as well as money. It is so carefully baffled, however, that money cannot be drawn back through it by any mechanical means.

The inspection plate is so well lighted that the ordinary lighting of the vehicle enables the driver to see the collections clearly at night. An accumulation of more than four ounces of coins will cause the plate automatically to discharge into the money drawer below if the conductor neglects to operate the discharge handle. If the box is overturned, the plate is closed, and therefore the passage to the money drawer.

In the receiving chamber at one side of the inspection plate is a

telltale ball so mounted that if the fare box is overturned the ball rises to the top of a vertical staff. It is held there by a latch underneath the plate which cannot be released until



*Showing push button for register of Springfield fare box.*

the box is returned to the office and opened, when of course the overturning of the box may be investigated.

The money drawer, a single-piece aluminum alloy casting carried in an opening at the lower part of the casing, can be removed only by an authorized person who is provided with a key to the Yale lock. In addition, an automatic locking device retains the drawer in the casing independently of the Yale lock mentioned above, until the inspection plate has been tripped and held down; this means that all coins on the plate are discharged into the drawer before it can be removed. The money drawer itself forms a portion of the front and bottom of the casing, so that when the money drawer is not in place the fare box cannot be used. Any money deposited would go onto the floor, and an inspector would see that the equipment was out of order.

The money drawer is provided with a separate cover cast of aluminum alloy. Through a passage in this cover, money and tickets from the inspection plate are deposited in the money drawer. The passage is closed by a sliding shutter, which is held closed by an automatic lock, which can be released only when the cover is unlocked and removed from the drawer.

The maker states that the construction provides for absolute safety of the contents of this fare box, because it is securely locked at all times. Theft is impossible by any means short of actual destruction, as there is no stage of the handling of the box when its contents are accessible to any one but the collector.

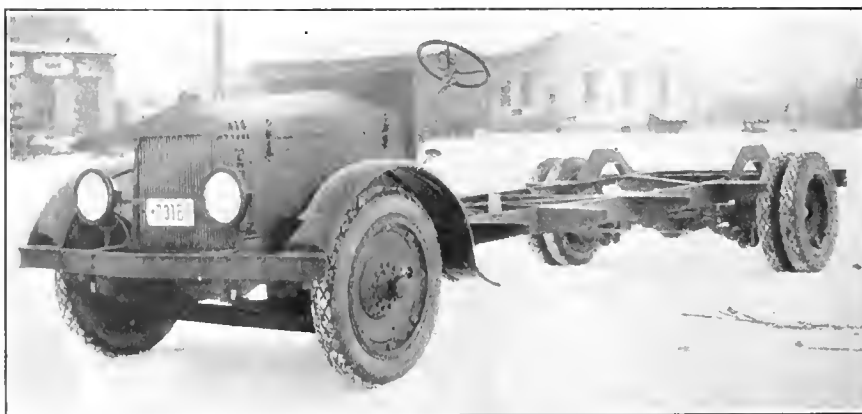
In addition to the safety devices, a passenger register is provided. The push button shown beside the receiving hopper is connected to a signal bell and to a visible register inside the glass receiving chamber, by means of which the operator registers the number of entering passengers.

The box complete is 21 in. high, 6 in. wide, 9 in. from front to back, and weighs 22 lb.

## Built-Up Frame in New Bus Chassis

STRUCTURAL steel members with forgings to give the kick-up over the rear axle are one of the features of the bus chassis put out by the Menominee Motor Truck Company of Wisconsin, Clintonville, Wis. This chassis, known as the Model DB, weighs 5,100 lb. and is designed to take bodies of from twenty-five to thirty-passenger capacity.

The construction is of the low-level, long wheelbase type. At the service door the chassis is 24 in. from ground to top of the frame. The Timken axle on the front has



*Menominee Model DB bus chassis for heavy-duty service*

68-in. gage, while the Wisconsin double reduction axle rear has 73-in. gage.

Equipment includes a Wisconsin 4x6 four-cylinder engine, Stromberg carburetor, Eisemann ignition, Detlaff multiple-disk clutch, Cotta four-speed gear set, Ross steering gear, and Tuthill springs. Goodyear pneumatic tires, 34x5 single front, and 34x5 dual rear, are fitted on Indestructible steel disk wheels.

### Plymouth Street-Car Type Body

**T**HE twenty-one-passenger body shown in the accompanying illustration is fitted with cross seats, each 32 in. wide, leaving 18 in. of center aisle. These seats are built up by the maker of the body, Plymouth Wagon Works, Plymouth, Ind., with leather upholstery, Heywood & Wakefield bases, and with D'Arcy coiled springs.

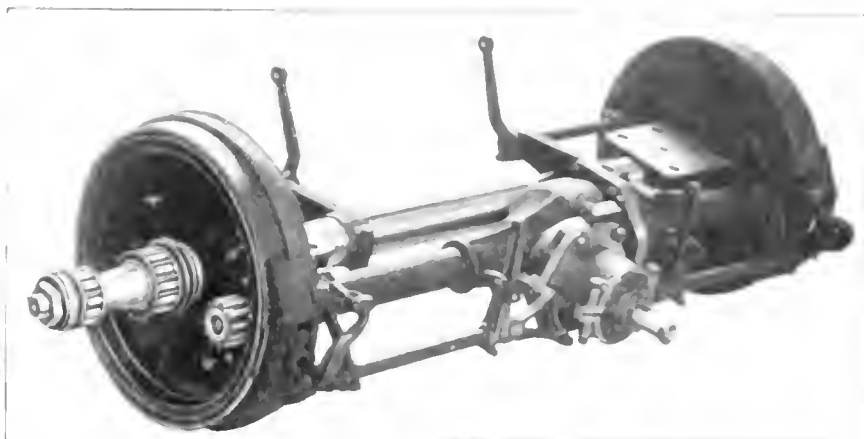
The body is heated by pipes inclosed in a perforated metal protector. Control is by Petry valves. Lighting is by dome reflectors, fitted with 20-cp. bulbs. The interior finish is white on the ceiling and mahogany below the bottom of the window.

For emergency service, a door is fitted on the left-hand side, back of the rear wheels. The front of this door is cut off diagonally at the bottom corner in order that it will conform to the line of the wheel housing.

The general dimensions of the body are as follows: Length, 15 ft. 6 in.; width, top of seats, 6 ft. 6 in.; width, bottom of seats, 6 ft.; height, inside, 6 ft. 1 in.



*Plymouth twenty-one-seat body. Grab rail and light at left of entrance. Emergency door at rear on left-hand side*



*Russel model 82 rear axle for 10,000 lb. load — spring pads*

### Internal Gear Axle Strengthened

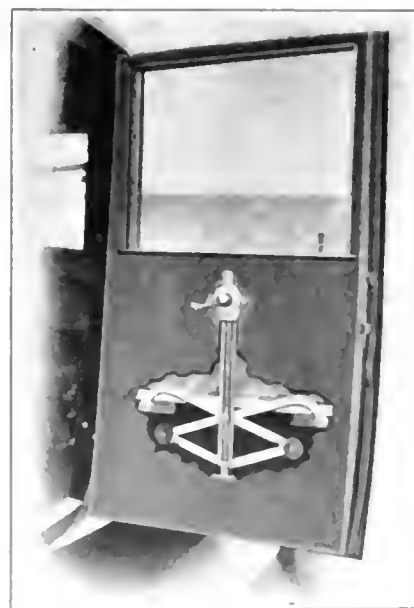
**I**N THE May issue of BUS TRANSPORTATION, page 297, a heavy duty axle made by the Russel Motor Axle Company, Detroit, Mich., was described. The company now announces that the model referred to previously has been replaced by a much stronger design.

The total weight of the axle has been increased only 55 lb., but extra strength having gone into larger parts for the driving mechanism. The pitch diameter of the bevel drive gear has been increased, as have also the number of teeth and the width of face. The drive-shafts have been made 1 in. larger in diameter, a larger differential is used, and its housing is now a drop forging instead of the casting applied on the former design. For bus service, the axle can be supplied in gages up to 70 in.

In the illustration is shown the latest type, model 83 axle.

### Raising and Lowering Windows

**T**HE "Common Sense" window regulator, as furnished by Ackerman-Blaesser-Fezzy, Inc., Detroit, Mich., is shown in the accompanying illustration. It weighs only 4 lb., but it is said will lift any size glass. The working principle of this regulator is such that equal pressure is exerted from both sides. It



*Regulator for side and rear windows of sedan-type bodies*

is claimed, therefore, that a wide window is just as easy to lift as a narrow one, so that the regulator is particularly useful on sedan-type buses with wide windows. The device is counterbalanced so that it operates smoothly and easily up and down, and in addition the strong tension under which it is held serves to prevent rattle.



# Condensed Specifications of Motor Vehicles for Bus Service

Revised to Feb. 3, 1923

Trade Name and Model	Capacity, Seats	Unloaded Weights, Lb.		Main Dimensions				Normal Speed, M.p.h.		Engine Details								Transmission		Axles		Final Drive	Steering Gear	Springs		Wheels		Tires		
		Chassis	Bus	Wheelbase	Cage, Front	Cage, Rear	Floor Height	Steering Height	High	Low	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Clutch	Gearset	Front	Rear			Maker	Special Feature	Brakes	Type	Type	Front	Rear
<b>Light Duty</b>																														
Acme 20.....	14	3,050	4,250	129	56	33	54	28	7	Cont.	3 1/2 x 5	V	Ryfd	T	Own FC	Eise-M	BgBk DP	Cotta-3	Timken	Tim. SF	W	Ross	R. 52 in.	R. Binel	Wd	P	35x5	35x5		
Avery.....	18	2,800	4,000	129	56	32	42	20	6	Own-6	3 1/2 x 4	G	Stomb	P	Harri H	KW-M	Own-DP	Own-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	34x5	34x5		
Chevrolet.....	15	2,840	4,200	125	56	36	42	25	6	Own	3 1/2 x 5	V	Znth	P	Long FT	Remy-B	Own-C	Own-3	Timken	Tim. SF	W	Ross		R. Hynos	Wd	P	33x4	33x4		
Commercial T.....	10	2,900	4,200	127	56	36	42	27	40	Cont.	3 1/2 x 5	V	Znth	P	Long FT	Eise-M	BrLp-MD	BrLp-4	Timken	Tim. SF	W	Ross		R. Budd	Wd	P	33x5	33x5		
Dodge-Graham.....	17	2,540	4,200	140	56	36	42	30	8	Dodge	3 1/2 x 4	V	Stwrt	Cp	McCd T	NE-B	Dodge-MD	Dodge-3	Timken	Tim. SF	W	Ross		R. Klisy	Wd	P	33x4	34x5		
Federal R2.....	12	2,950	3,850	124	56	36	42	35	11	Cont.	3 1/2 x 5	V	Znth	C	Long T	Eise-M	BgBk-DP	Drt-3	Timken	Tim. SF	W	Ross		R. Dist	Wd	P	33x5	33x5		
Ford T.....	12	1,430	3,300	124	56	36	42	22	6	Own	3 1/2 x 4	G	Mrvl	P	Own FT	Eise-M	Own-DP	Plan-2	Timken	Tim. SF	W	Ross		R. Klisy	Wd	P	30x3	32x4		
G.M.C. K-16.....	14	3,300	5,300	132	56	36	46	25	6	Wauk	3 1/2 x 5	G	Mrvl	P	Own FT	Eise-M	Own-DP	Own-3	Timken	Tim. SF	W	Ross		R. Indes	Wd	P	34x5	34x5		
International S.....	14	2,760	3,510	124	56	36	42	30	7	Lyeng	3 1/2 x 5	G	Ensgn	T	Long FT	Eise-M	Own-DP	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Indes	Wd	P	34x5	34x5	
Larrabee-Deyn.....	15	3,350	4,700	138	56	36	53	45	10	Cont.	3 1/2 x 4	G	Znth	Cp	Fdrs. FT	Bosch-R	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Imperial	Wd	P	34x5	34x5		
Mason.....	14	2,950	4,300	131	56	36	50	40	6	Hrds	3 1/2 x 4	G	Znth	Cp	Fdrs. FT	Bosch-R	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Imperial	Wd	P	34x5	34x5		
Moreland.....	16	4,000	6,000	180	56	36	67	30	8	Hrds	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	Own-DP	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Own	Wd	P	32x6	34x5	
Nash 2,018.....	16	3,400	4,000	130	56	36	67	25	8	Own	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	Own-DP	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Own	Wd	P	32x6	36x6	
Oldsmobile.....	14	2,600	4,000	128	56	36	46	35	8	Own	3 1/2 x 5	V	Znth	Cp	Own FT	Remy-B	BgBk-D	Wm-3	GMC	Timken	Tim. SF	W	Ross		R. Aut. Wh.	Wd	P	33x4	35x2	
Reo.....	16	2,560	4,000	128	56	36	46	35	8	Own	4 1/2 x 5	V	Znth	Cp	Own FT	NE-B	Own-MD	Wm-3	GMC	Timken	Tim. SF	W	Ross		R. Aut. Wh.	Wd	P	33x4	35x2	
Republic 75.....	14	2,650	4,000	134	56	36	42	30	8	Unkly	3 1/2 x 5	V	Znth	Cp	Own FT	At t-B	Fuller DD	Fuller-3	Timken	Tim. SF	W	Ross		R. Mot. W	Wd	P	32x4	34x4		
Rowe CW.....	19	3,820	6,280	133	56	36	47	25	6	Buda	3 1/2 x 5	V	Znth	Cp	Fdrs. FT	Eise-M	BrLp-MD	BrLp-4	Timken	Tim. SF	W	Ross		R. HpsDI	Wd	P	34x5	36x7		
Rumely.....	18	4,100	5,100	144	56	36	47	25	5	Buda	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. HpsDI	Wd	P	34x5	36x7		
Sanford W-15.....	15	3,820	5,100	145	56	36	47	25	5	Buda	3 1/2 x 4	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Indes	Wd	P	34x5	36x7		
Service 15.....	18	3,100	4,500	144	56	36	42	40	10	Cont.	3 1/2 x 5	V	Znth	Cp	Long FT	Cmny-B	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Indes	Wd	P	34x5	36x6		
Standard 55.....	10	3,000	4,000	134	56	36	50	35	10	Cont.	3 1/2 x 5	V	Znth	Cp	Long FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Dist	Wd	P	33x4	35x2		
Stoughton.....	16	3,100	4,000	134	56	36	50	35	10	Cont.	3 1/2 x 5	V	Znth	Cp	Long FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Dist	Wd	P	33x4	35x2		
Thomson.....	15	3,100	4,400	134	56	36	42	30	8	Unkly	4 1/2 x 5	V	Znth	Cp	Stdtd. H	West-B	W Cp DP	Wm-3	Timken	Tim. SF	W	Ross		R. R. yer	Wd	P	34x5	36x6		
Transport 25A.....	16	3,700	5,500	140	56	36	42	30	8	Unkly	3 1/2 x 5	V	Znth	Cp	Stdtd. H	West-B	W Cp DP	Wm-3	Timken	Tim. SF	W	Ross		R. Binel	Wd	P	34x5	36x6		
United States U.....	15	3,400	4,500	138	58	38	44	30	6	Cont.	3 1/2 x 5	V	Znth	Cp	Long FT	Eise-M	Fuller DD	Fuller-3	Timken	Tim. SF	W	Ross		R. Shwtz	Wd	P	35x5	36x6		
<b>Medium Duty</b>																														
Acme 40.....	22	3,980	6,380	141	58	34	64	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BgBk DP	Cotta-3	Timken	Tim. SF	W	Ross		R. Binel	Wd	P	35x5	38x7		
Aterbury 20R.....	18	4,500	5,750	144	58	38	44	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Brig-M	Fuller DD	Fuller-3	Timken	Tim. SF	W	Ross		R. Arbbd	Wd	P	34x5	36x6		
Autocar 2-31.....	22	5,350	7,800	138	60	40	42	18	5	Own	4 1/2 x 5	G	Stomb	Cp	Own FT	Mag-M	Own DP	Own 4	Timken	Tim. SF	W	Ross		R. HpsDI	Wd	P	36x6	36x6		
Clydesdale 20.....	3,500	4,000	140	58	60	38	44	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. HpsDI	Wd	P	34x5	34x5		
Corbett.....	20	5,200	7,700	168	56	38	44	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Binel	Wd	P	36x6	36x6		
Day-Elder.....	20	5,200	7,700	168	56	38	44	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. Binel	Wd	P	36x6	36x6		
Defiance D.....	20	4,210	6,410	178	55	35	29	72	30	8	Unkly	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	38x7	
Diamond T-U.....	23	4,000	6,200	170	58	38	44	21	5	Cont.	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	38x7		
Duplex AB.....	23	4,400	6,700	160	56	36	42	25	6	Own	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8		
Fagot.....	21	5,700	7,300	218	70	70	20	74	35	7	Hi-Se	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8	
Federal TE.....	18	4,250	5,600	134	56	38	44	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8		
G.M.C. K-20.....	20	4,210	6,410	178	55	35	29	72	30	8	Unkly	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8	
Hahn.....	23	4,700	7,700	173	56	38	44	21	5	Cont.	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8		
Hurlbut.....	18	4,400	6,700	160	56	36	42	25	6	Own	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8		
Kalamazoo-G1.....	18	4,450	7,800	144	56	36	42	25	6	Own	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8		
Kissel Coach.....	17	5,120	7,780	202	64	66	22	65	25	6	Buda	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8	
Master J B D.....	22	5,600	8,300	170	59	39	26	59	25	6	Buda	4 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8	
Moreland.....	20	4,975	7,430	140	56	36	42	21	5	Wise	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P	36x6	40x8		
Nash 5018.....	24	3,950	5,600	147	58	38	44	21	5	Cont.	3 1/2 x 5	V	Znth	Cp	Own FT	Eise-M	BrLp-MD	BrLp-3	Timken	Tim. SF	W	Ross		R. St. Mary	Wd	P				



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# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transportation  
industry.

## The Use of the Interurban Bus\*

By Installing a High-Grade "Coach" Service Between Youngstown and Warren, the Pennsylvania-Ohio Electric Company Eliminated All Other Bus Competition and Built Up a New and Increasing Traffic

BY GARRETT T. SEELY

Vice-President and General Manager,  
The Pennsylvania-Ohio Electric Company

THE Pennsylvania-Ohio Electric Company has for many years operated a 15-mile suburban line between Youngstown and Warren, following the main public thoroughfare alongside the Mahoning River. The line for its entire length is situated in the heart of the steel manufacturing district and extends through a large part of Youngstown, Girard, Niles and Warren. Of the total length of 15 miles, 11.4 miles is on city streets, divided as follows: In Youngstown, 3 miles; in Girard, 1.7 miles; in Niles, 3.7 miles, and in Warren, 3 miles.

In the short distances between cities, the electric railway is on the side of the main highway but none of its length is on private right-of-way.

Youngstown has a population of approximately 140,000, Girard nearly 10,000, Niles 13,000 and Warren 27,000. The electric railway line throughout its entire length, with the exception of a short distance in Warren and 3 miles in Youngstown, is single track. In addition to the disadvantage of having so large a part of its route in city streets, the electric railway line describes a circuitous loop through the business district of Niles, this loop being 0.64 mile in length and requiring seven or eight minutes for the cars to traverse.

A regular all-day headway of twenty minutes is maintained on the Youngstown to Warren suburban line. On the same track, there is a shorter suburban service between Youngstown and Girard on a twenty-minute headway so that there is a ten-minute service to Girard. From the mid-town terminus of the line in Youngstown to the city limits of Youngstown, a route distance of 3 miles, a frequent service is given by the Youngstown Municipal Railway with safety cars. As a result of the large proportion of the line in city streets, frequent through service and additional service to Girard and the city limits of Youngstown, the through service from Youngstown to Warren and from Warren to Youngstown is

slow, the service between the two cities being given by seven cars on a headway of twenty minutes and making the trip in one hour and ten minutes.

### WHY THE COACH SERVICE WAS INAUGURATED

There has been a persistent demand for quicker service between these communities. The Erie Railroad parallels the electric railway and, on account of the frequent through service between Pittsburgh and Cleveland by way of these cities, is to a certain extent in competition with the Youngstown, Niles and Warren electric railway line. A great deal of the local travel in the valley avails itself of the steam railroad facilities. The steam trains make the trip from Youngstown to Warren in thirty-five to forty minutes.

In March, 1921, bus competition commenced on this line and gradually increased. The original bus service consisted of a rebuilt Cadillac chassis with custom made body, seating fourteen people. On Aug. 1, 1922, the bus competition along this route consisted of three such Cadillac units, two large Mack buses of the street car type, one Garford bus of the street car type, and a large number of touring cars. The fare on the buses ranged from 25 to 40 cents. That on the electric railway from Youngstown to Warren was 30 cents with a 10-cent intermediate cash fare between towns. Zone tickets are sold for \$1, three of which are acceptable for the through fare between Youngstown and Warren, thus making the one-way fare 22 cents with tickets.

Careful investigation and checking of the competitive bus service indicated that the bus lines were carrying passengers that had not been carried by the electric cars, some of this additional traffic being from the steam railroad and some of it being traffic they had developed through the service they were giving. The buses made the trip from Youngstown to Warren in approximately fifty minutes, twenty minutes less than the electric cars. This not only attracted traffic that would otherwise have gone upon the cars, but increased the riding habit between the communi-

ties. These buses were, however, more or less noisy and inconvenient; the schedules were poorly adhered to; the drivers were not uniformed or markedly courteous, and, in general, the bus service, given as it was by a large number of independent owners, lacked the necessary discipline and responsibility to attain the best results. However, the traffic on the buses was increasing in volume due to the saving in time and due to the fact that some people apparently preferred the gas car service.

To compete successfully with the buses and prevent further interference with electric railway patronage, it was apparent that the running time of the cars would have to be reduced. The cars in use were modern light-weight interurban cars with modern motors. They were constructed with large folding doors in front and in the center so that traffic interchange was as rapid as has been developed in street railway practice. The cars were geared to obtain a running speed of from 40 to 45 m.p.h. City stops had been eliminated to such an extent that litigation was in progress with the different communities over the question of stops. It was apparent that the only way to put on a faster electric limited service was to double track the line, and since so large a proportion of the line was in city streets, this would involve an expenditure of approximately a million dollars, and the limited service possible after such expenditure would be given subject to such disadvantages of franchise provisions as to stops as would slow up schedules and this at low rates of fare. Manifestly, such an expenditure was not possible.

As limited service could be given with gasoline buses with very much less original expenditure, without restrictions as to stops that would destroy efficiency, and with fares that could be fixed to pay the cost of services, it was determined to give this limited service. The study that had been made of the existing bus lines convinced the company that in inaugurating the gas car service vehicles should be secured which would be attractive and clean, which would be free from mechanical noises, which should run strictly according to definite schedules and in which the passenger would not have to scramble for a seat and in which all passengers could sit comfortably. Decision to render this kind of service was made in January, 1922, but the service was not inaugurated until Aug. 1, 1922, because of the time spent in investigating to determine the correct type of vehicle and service. The White Model 50 bus chassis was adopted but with a modified straight bevel gear, single-reduction rear axle with gear ratio of 4.25 to 1. This axle was adopted on account of the fact that the 15-mile trip was to be made over a good road with but few stops and without heavy grades. Its adoption cut down the engine speed to the usual traveling speed of the vehicle.

\*Abstract of paper presented at annual meeting of Central Electric Railway Association, Louisville, Ky., Jan. 18 and 19, 1923.

thus reducing wear and tear on the engine and body and reducing vibration. Through collaboration with the Bender Body Company of Cleveland, a limousine type of body was developed, seating eighteen passengers on cross seats. The driver is separated from the passengers by a glass bulkhead as in the ordinary type of passenger limousine, and all passengers have plenty of elbow and leg room. The seats are upholstered in a special variety of embossed leather. The fittings of the limousine in the way of carpets, curtains and other accessories are of the highest type. The whole aim was to make the vehicle outside and inside so attractive in appearance that it would draw attention on the streets and at the stations, and also give a passenger a sense of riding with the utmost degree of comfort. To distinguish the new vehicles from the often forlorn and decrepit-looking vehicles called buses, they are called coaches. While the coaches were being manufactured an intensive advertising campaign was carried on throughout the entire territory of this company, calling attention to the coach service that was being inaugurated.

A half-hour headway was decided upon and five coaches ordered—four for regular service and one to serve as a spare. In the meantime, drivers were selected and trained, the original selection of seven drivers being made from 239 applicants. A chauffeur's uniform of gray whipcord was selected and a cap bearing the insignia "P.O." Each driver was provided with two suits so that the uniforms could always be kept neat.

#### THE FARE FIXED IN ACCORDANCE WITH THE QUALITY OF THE SERVICE

The fare between the terminal cities was fixed at 45 cents, this being double the lowest ticket fare on the electric railway and higher than the fare of the competing independent buses. The service was inaugurated on Aug. 1 and from the standpoint of traffic has been successful from the start. By the first day of October the competitive buses had disappeared from the field and the service from Youngstown to Warren at the present time is being given exclusively by the electric cars and coaches. The receipts from the coach lines since the inauguration of the service have been as follows: August, \$8,986; September, \$9,283; October, \$12,580; November, \$11,320; and December, \$13,707.

Immediately after service started, two additional coaches were purchased for this line. In October, three more coaches were purchased for similar service on another line of the company, and two additional coaches purchased in November brought the fleet up to twelve.

Inquiry from the bus operators previously on this route indicated that their business during the cold months of the year was from 25 to 40 per cent less than during the warm sea-

son. This is not true with the P-O coach service. Perhaps the business is increasing through its merit as transportation service sufficiently to overcome the natural seasonal changes. It is our belief that in the spring business will probably be greater than at present. Now the service is on a fifteen-minute headway from 12 a.m. until 6 a.m., on a half-hour basis in the mornings and on a twenty-minute basis in the late evening. On Saturdays, Sundays and holidays, the service is fifteen minutes throughout the greater part of the day.

Ticket offices are maintained in both Youngstown and Warren, and ticket sales are limited to the seating capacity of the coach.

Tickets are on sale at all times in advance for any trip. At both terminals a seat chart is maintained for each trip during the day, and all tickets are stamped with the leaving time of the coach so that advance sales are conveniently made and insure a seat. Unused coach tickets are redeemable at any time at any ticket office of the company. During December, the ratio of receipts to possible receipts was 50 per cent, that is, if every seat on every trip had been paid for, the receipts would have been double the actual receipts secured.

As to the effect of the coach line upon the electric railway line, the following figures are of interest: The receipts from the Youngstown-Warren electric railway line for December, 1922, were \$30,632, which was an increase of \$43 over December, 1921. This company operates two other suburban lines of approximately the same length as the Youngstown-Warren line. On one of these, the receipts for December were \$1,098 more than the year before, and on the other \$1,150 more. The Youngstown-Warren line could, therefore reasonably have expected from \$1,000 to \$3,000 in December. Evidently, then, the coach business created a new traffic, representing in excess of \$10,000, or 33 per cent increase over existing traffic. A limited street car service would hardly have produced such an increase.

Our original installation of tire equip-

ment comprised 36 x 6 pneumatic tires carried on Budd Michelin disk wheels with dual wheels in the rear. None of the rumored disadvantages of dual wheels has developed in practice, the wear on the tires being very uniform. After five months of operation we can expect an average mileage of nearly 20,000 per tire with 36 x 6 tires in our service. We have changed several coaches to 34 x 5 tires with good results. We have had few delays or interruptions to service on account of tire trouble, and only two or three cases of puncture on the front wheels. In case of a puncture or other trouble on one of the tires on the rear wheels, the vehicle can run on the other tire to the terminal, where the wheel can be changed.

Until severe cold weather set in we were getting about 8 miles per gallon of gasoline. In order to keep the vehicles comfortable during the cold season the engines are allowed to run continuously. This cuts down the mileage per gallon of gasoline, but we do not need to use wood alcohol or other anti-freeze solution in our radiators.

#### New Association Formed in Indiana

A PLAN to fight legislation detrimental to motor bus owners has been prepared by a committee of the Newly organized Indiana Bus Owners' Association. Amendments to any excessive tax measure have been prepared and are held in reserve pending introduction of such measures in the General Assembly, now in session. Representatives of the association have been watching the legislative situation for a month.

The motor bus owners favor a gasoline tax, according to Stanley Pitchford, secretary-treasurer of the organization, and E. S. Cook, an owner of one of the larger lines. They stand united, however, against the flat-rate tax of 1½ cents a ton-mile, which has been proposed. The motor bus owners are willing to pay proportionately, but feel that it is unfair to them to impose such a tax.

#### Meetings, Conventions and Exhibits

Feb. 4-10	Troy, N. Y.	Automobile Show, I. M. P. A. 1923
Feb. 4-10	Portland, Ore.	Automobile Show, R. Stachl, 424 B. 1923
Feb. 5-10	Worcester, Mass.	Automobile Show, W. R. L. 1923
Feb. 5-10	London, Ont.	National Motor Show of Western Canada
Feb. 5-10	Winnipeg, Man.	Western Canada Automobile Show, 1923
Feb. 5-10	Winnipeg, Man.	Automobile Show, R. C. L. 1923
Feb. 5-12	Waterbury, Conn.	Automobile Show, M. A. P. 1923
Feb. 5-11	Cleveland, Ohio	Automobile Show, H. A. B. 1923
Feb. 13-17	Kalamazoo, Mich.	Automobile Show, H. P. A. 1923
Feb. 13	Rochester, N. Y.	Automobile Show, W. A. S. 1923
Feb. 17-24	San Francisco, Calif.	Auto-Hwy Association, New York, 1923
Feb. 17-24	Hartford, Conn.	Auto-Hwy Association, New York, 1923
Feb. 19-24	Grand Rapids, Mich.	Auto-Hwy Association, New York, 1923
Feb. 21-24	Trenton, N. J.	Auto-Hwy Association, New York, 1923
Feb. 26-Mar. 3	Omaha, Neb.	Automobile Show, A. B. W. 1923
Mar. 5-10	Indianapolis, Ind.	Automobile Accessory Show, I. B. C. 1923
Mar. 8	Richmond, Va.	Virginia Automobile Dealers Association

## The Engineer in Public Affairs

Italian Ambassador Gaetani Believes Engineer Should Participate in International Affairs—Advocates Close Commercial Relations Between His Country and United States

**P**OLITICS needs a larger dose of logic and practical sense. Prince Gelasio Gaetani, new Italian Ambassador to the United States, so declared in an address at the annual dinner of the American Engineering Council of the Federated American Engineering Societies held at the Chevy Chase Club, Washington, on Jan. 11. These qualities of the engineer, he said, would bring great advantages to public affairs.

The Ambassador, himself an engineer and for thirteen years previous to the war a resident of the United States, said that his principal aim is to strengthen the bonds of friendship and esteem between this country and Italy. Recalling his engineering career in the West following his graduation from the Columbia University School of Mines in 1903, Prince Gaetani said that he was returning not only as a diplomat but as an engineer and friend of America.

In part the Ambassador's speech follows:

We pride ourselves in saying: "Once an engineer, always an engineer." Whatever may be the course of life followed by one of us, it will always be marked by the indelible seal of the scientific, practical and logical training to which an engineer is subjected during the early years of life and we can say that in each and every occupation we have felt and thought and acted chiefly as engineers.

Some have made the remark in criticism that engineers lack political intuition and ability; I would answer that a larger dose of logic and positiveness applied to politics would bring great advantages to public affairs.

Whatever the case may be it is very agreeable that politics bears little weight in the relations between Italy and the United States. Between our two countries there has never existed political rivalry or serious commercial competition; our relations have been confined almost exclusively to contacts of labor, of engineering, of commerce, of science and of art.

These conditions, the deep feeling of affection that I have for your country, and the desire of faithfully serving my country in such an important moment, have induced me to abandon suddenly my many occupations and to accept the mission entrusted to me. Much can be accomplished to the mutual advantage of our peoples, but a large share of the success will depend upon the co-operation of the engineers.

The characteristics of our two countries are both distinct and complementary; each has much to offer to the other, and many good qualities and noble aspirations are common to both.

I do not hesitate to state that Italy and the United States are at present the most youthful nations of the world. Italy is the oldest one in history and three times has ruled the world; once

politically, once spiritually and once intellectually. However, as a political and social unit Italy did not exist from the fall of the Roman Empire to the middle of the last century; as race and as nation it had an enforced rest of some fourteen centuries. With the forming of its national unity in 1870 it awakened to a new life; born again as a new being to play its rôle in world's history, it is healthy, fertile and exuberant of youthful energies.

The best proof of this is given by the latest events which led to the establishment of a new national government. The younger and healthiest part of the people, the bulk of the nation, openly rebelled against the old ways which were leading Italy into a critical condition; not only bolshevism and anarchy have been wiped off the map, but also demagoguery and all low-grade politics aiming to the fostering of party and class interests.

The other youngest nation in the world, I was saying, is the United States, the new great power of the history to come; unlimited in its financial powers, unrivalled in its capacity of organization and technical knowledge, wonderful in the possibilities of its vast empire.

The co-operation of these two young countries will lead to remarkable results; both our peoples are laborious and have an inventive, engineering turn of mind.

Italy's largest asset is the remarkable quality of its people's labor; sober, intelligent, hardworking and plastic, the Italian peasant or workman will in an incredibly short time become efficient in whatever he is called upon to do.

The electrical industry in our country has made rapid strides, and as to percentage of utilized water power Italy ranks, I believe, foremost in the world. Electricity is our "white coal" and at the present day its use results in an economy of about two billion lire, otherwise necessarily spent on fuel imports.

The newly redeemed provinces in northern Italy are virgin ground for hydro-electric engineering, because Austria for political reasons prevented the development of the power plants which could only have an outlet toward Italy.

Another interesting plan which is gradually being carried through is to connect the northern power plants, fed by the summer streams of the Alps, with those of central Italy where water is plentiful in winter and rather poor in summer, by a network of high-tension lines and by standardization of voltage to obtain a better seasonal compensation than could be secured by the use of even very large reservoirs.

But I must not lose myself in details! I shall only mention the new and wonderful deposits of magnetite near Cogne and the leucite deposits near Naples which some day will make of Italy one

one of the greatest potassium salts producers of the world.

Railroads are to be electrified and telegraphs and telephones are to be reorganized, then gradually handed over to private enterprises; experience has proved that state administration of industrial concerns ends always in a financial and technical failure.

I should mention also the large works for reclaiming waste or marshy land by irrigation or drainage. There are 148 enterprises of this kind in Italy for the reclamation of some 3,000,000 acres of land; of these thirty-five have been completed, covering an area of about 820,000 acres. Personally I was engaged in this kind of work when I was called to sail for America, and felt sorry to leave, since the bettering of the Pontine Marshes, while very difficult and complicated, is a most interesting problem.

There are most remarkable possibilities for increasing the commercial and industrial exchange between Italy and the United States. Each of our countries is especially fit for the production of certain kinds of products. You have the raw materials, you produce wheat cheaper than we can, you have the means and the capacity to build machinery in series. We have arts and products of our own and skilled and intelligent workmen to turn out to better advantage any material in which labor accounts for a large percentage of the cost.

For each item there exists a difference in cost between Italy and America which causes merchandise to flow from one country to the other and creates a circulation of products; that is, commercial and economic intercourse. These differences are a vital, indispensable requisite for prosperity.

The only thing I want to realize now is that I am standing here in the midst of many good friends. For thirteen years I worked in your country, and your people have been kind and hospitable to me beyond words. I will never forget this.

### Permanent Association Formed in Pennsylvania

**A** MEETING of the Pennsylvania Motor Bus Owners Association, held in the Penn-Harris Hotel, Harrisburg, on Jan. 4, was attended by twenty-three operators representing directly and by authority thirty bus companies. The provisional organization formed on Dec. 18 through the efforts of E. B. Burritt, manager of the National Motor Transportation Association, was made a permanent one, with Frank Martz, Plymouth, president, and W. J. Emerick, Bellefonte, treasurer.

The scale of dues was fixed at \$25 per annum for each bus owned. It was decided that the association would employ a permanent secretary with headquarters in Harrisburg. The following committee was named to draft a constitution and by-laws and perfect organization details: T. D. Boal, Boalsburg; D. J. Forney,

Gettysburg & Harrisburg Transportation Company, Gettysburg; and W. J. Emerick, Emerick's Bus Lines, Bellefonte. Funds for immediate use were provided through an underwriting arrangement made by those present.

At a later meeting held in the Penn-Harris, Harrisburg, on Jan. 25, thirty-three companies were represented, many of whom were not represented at the first meeting. In the absence of President Martz, R. C. Miller acted as chairman of the meeting. Mr. Burritt, of the National Motor Transport Association, was secretary.

A report on membership showed that the present membership numbers fifty-two operators and seven manufacturers.

The fee for manufacturers was fixed at \$50. Among the matter discussed, insurance and finance played a prominent part. Several of the officers and a number of the members expressed themselves in favor of joining the national association as a state association and consideration of the matter was postponed until the next meeting, when it is hoped that the finances of the association will permit its entrance into the national body.

The following vice-presidents were elected: R. C. Miller, Gettysburg & Harrisburg Transportation Company; P. H. Coreoran, Westchester Transportation Company; Charles Harry, Newenstle.

tween bus and car. For the first thirty days the independent line ceased operation. This was due to the fact that we maintained a regular schedule over an eighteen-month period. We kept our buses neat and ready at all times, employed only the best drivers obtainable and issued transfers to and from cars and busses. This line, following the first month, has yielded a profit. It covers a street where a car line extension would probably pay with a reasonable rate of fare.

The next line to be established was a "feeder" to our West Market line, a cross-town line extending from the southern section of the city and intersecting four street railway lines, and one into the northern section. These three lines began operation early in August and do a heavy transfer business to and from car lines. 40 per cent of the passengers being transfer passengers. All these lines have lost money from the beginning, show no indication of doing otherwise and so far as we have been able to determine have not increased the street railway revenue.

Our next step was taken in October, when we bought out an independent operator who was using five buses on a line extending from the downtown district out West Exchange and South Maple Street into a developed territory in the southwestern section of the city. In addition we put in a line across a new city viaduct spanning the Cayahoga

## Urban Motor Bus Operation and Cost\*

Bus Operation on a 5-Cent Fare with Interchangeable Free Transfers to Trolley Cars Has Resulted in a Deficit—Nevertheless, Popular Demand for Bus Service Must Be Met by Established Street Railways

BY A. C. BLINN

Vice-President and General Manager,  
Northern Ohio Traction & Light Company

HAVING gone through nine months of bus operation in the city of Akron, the service being auxiliary to the city railway system of the Northern Ohio Traction & Light Company, I stand today in the wilderness of transportation problems and wonder whether this Star of Busism will yet lead us into the Valley of Despair, or onto the Road of Success. I am not yet ready to subscribe to the growing theory that buses are indispensable in a city's transportation system; and most assuredly I am not convinced of their economy. It will take more than our experience to prove the advisability of using buses as feeders; I am more ready to agree that they are successful as a temporary substitute for a needed railway line into a partly developed territory.

I do not mean that we plan to curtail our bus operation; I do not say that we will not establish additional lines. In all human probability we shall continue our bus development. I am convinced the public demand for bus operation is not subsiding, and I am just as firmly convinced that their operation properly belongs to an established transportation company—the street railway—and not to irresponsible operators. I subscribe to the belief that if the public actually wants bus transportation, the public ought to have it, but the public should pay the cost, and that cost must embrace full redemption of the investment.

It is cost that I first desire to discuss, and in this connection I shall present some comparisons taken from our records. Please remember that our company, in the city of Akron, is still operating on a 5-cent fare with free transfers, and in the figures I submit the point that our car lines are losing money should not be forgotten. The bus fare is the same as the railway

fare and the transfer privileges are also identical. Transfers are interchangeable between car lines and bus lines.

Our company first entered the bus field on March 19, 1922, establishing a line from the downtown section of



One of the White bus chassis with Kuhlman steel body operated by railway company in Akron, Ohio

Akron westward out what is known as Maple Street, to Exchange Street, where the bus line intersects a railway line at its terminal, the bus line continuing out Exchange Street to about the city limits. The territory is all thickly populated. At the time the line was established an independent line was operating over the same route. We voluntarily issued free transfers be-

Valley to the north from the downtown section and supplied service to the northeast section of the city. We also established a "feeder" to our West Market Street line reaching beyond the city limits into a sparsely settled section to the west. None of these lines has shown a profit, although we expect the viaduct line ultimately will produce a profit and hope the South Maple Street line

\*Abstract of paper read before Central Electric Railway Association, Louisville, Ky., Jan. 18-19, 1923.



will do the same. These are only hopes, however, for figures give no such indications.

In all, we operate twenty-four buses. All but five are Kuhlman closed bodies mounted on White model 50 chassis. The other five are on White chassis with special bodies not so satisfactory as our new ones. We are remodeling the old one to conform with the Kuhlman bodies. The buses are pleasing the public and have given satisfaction. We believe the operating cost is below the average so far as we can determine from figures of other operation in Akron and vicinity, but I submit the following comparison for your careful consideration as showing the differences between bus operating costs and car operating costs:

	Cars	Buses
Fare with transfer exchange, cents .....	5	5
Average fare per passenger carried, cents .....	4.07	3.8
Percentage transfer passengers to total .....	20	24
Maintenance based on passengers carried, cents .....	0.41	1.12
Depreciation (monthly), per cent .....	0.5	2.25
Fuel (power vs. gasoline) cost per passenger, cents .....	0.4	1.14
Per cent operation to gross .....	86.82	98.89
Gross earnings per car-mile, cents .....	33.12	24.53
Speed per revenue mile per hour, miles .....	8.8	8.49
Seating capacity .....	55	25

Up to Dec. 1 the gross revenue from our bus lines totaled \$78,252.74. During this time the maintenance alone has been \$18,875.97—more than 24.13 per cent. And we believe we are conducting our maintenance department as economically as possible and give the equipment the proper attention. This maintenance expenditure was divided as follows:

	Amount	Per Cent of Gross
Chassis .....	\$11,605.46	14.83
Body .....	1,963.98	2.52
Tires .....	4,814.77	6.15
Miscellaneous .....	491.76	0.63

During the period referred to, that is from the establishment of the bus lines up to Dec. 1, we carried 1,560,845 revenue passengers and 476,139 transfer passengers, a total of 2,036,984 passengers. The bus-miles operated were 337,021 and we used 66,969 gallons of gasoline at an average cost of a trifle more than 26 cents per gallon. We have charged off \$12,415.08 for depreciation, \$3,869.78 interest and \$740.72 taxes. These figures are based on the value of the property used in the bus operation. In the matter of insurance, superintendence, wages, etc., the charges are direct. For injuries and damages a charge of 6 per cent of the gross has been set up. It is yet to be determined whether some of the charges are proper, but so far we cannot see that any of them are excessive. Based upon all charges the lines show a total loss of \$12,928.49 on a gross of \$78,252.74 for the period ending Dec. 1.

So much for costs in dollars and cents. I now want to take up this question of maintenance, for that appears to be the burden of responsibility. The

buses must be kept in first-class condition. If not, the depreciation will soon become so great that the average life of a bus is cut in two.

The maintenance of the buses was assigned to the shop department on the theory that many of the bus parts are the same as car parts, thus making it possible to reduce the amount of stock necessary to be kept, while car machinery could be used to do bus work.

Instead of hiring garage mechanics for bus inspection, trained car inspectors were used and a written inspection and oil schedule laid out similar to that used on electric cars. These men are far more reliable than the average mechanic, having been trained to the high standard of electric car inspection. They check all parts for wear and keep the engines clean.

The bus operators are uniformed drivers who have no tools and make no repairs, but submit written reports as to the condition of the bus at the end of the run. The name of the bus operator is posted in the bus for the convenience of the public and as a matter of record.

A part of the inspection shop was used as a garage by cementing over the floor, thus saving the necessity of building or renting a garage.

The buses run on an average of 160 miles per day, or nearly 5,000 miles per month, and, due to the frequent stops and hilly contour of Akron, it is necessary that they be operated in the lower gears a considerable part of the time. This is a very severe service and has developed, within a few months, troubles that do not regularly occur on ordinary freight trucks within two or three years.

Because of our peculiar conditions, that is, the extremely heavy grades, it has been found advisable to equip the buses with three sets of brakes—two on the rear wheels and one on the drive shaft. The brake bands wear so rapidly that our repair men have become experts and can change them almost as quickly on the bus as on a car. Extra brake bands are always kept relined and ready for instant service. The brake drums soon score, but instead of buying new drums the old ones are built up by electric welding. These welded drums are harder than the original and, therefore, give longer life. The cost of repairing the drum is less than one-half the price of a new one.

We have found it advisable to do all the gasoline filling from the inspection shop tanks and thereby prevent any delay to service. We are also enabled to secure a better check on the quantity and quality of gasoline used. For the reason that on some of the long runs (more than 230 miles daily) the original 35-gal. gasoline tanks would not suffice, it was necessary to install a 17-gal. auxiliary tank. The buses, therefore, leave the garage with 52 gal. of gasoline daily. In order to secure a uniform quality of gasoline, we put in apparatus for making the standard distillation test of the American Society of Testing Materials, for under the

modern methods of making gasoline, testing the gravity does not determine the quality. As the gasoline bill for the twenty-four buses runs approximately \$5,000 per month, this item of fuel has received much study from all angles. Low test gasoline from 58 to 60 gravity with high end point was given a test for three months on three of the buses with different types of carburetors. Although this gasoline gave greater mileage per gallon, and showed a big saving for a month over a high test gas of 69 to 72 gravity, it was found advisable to use the high test. With the hill conditions, and frequent stops, the cars soon filled with carbon and did not have sufficient power with low-test gas for climbing the hills. Tests have been made of different types of carburetors and the latest type has resulted in a saving of several hundred dollars per month in gasoline.

In an effort to stop the breakage of springs, tests are being made of heavier and graduated springs with extra leaves that come into play with the extra load. No definite decision has been reached as to the best spring. Westinghouse air shock absorbers are also being tried, but definite conclusions have not as yet been made.

The question of the use of tires has received very careful consideration—ten different makes of pneumatic tires being tested. As yet, however, definite results have not been reached, little material difference having developed. Solid tires and cushion wheels were tested but did not give the high grade of riding that was obtained from the pneumatic tires, and it also developed that the mileage per gallon of gasoline is considerably greater with pneumatic tires.

All buses used in service are equipped with 36 x 6 tires, with dual wheels in the rear. There was fear that the air might become low in one of the dual tires, not be noticed, and run for some time, one of the tires thus carrying the entire load and breaking down the fabric. This situation is followed very carefully on the inspection schedule, tests being made every night and the air pressure being brought up to standard. Drivers are also instructed to get out of the car at the end of the run and carefully look over the rear tires, testing them as best they can. In this way flat tires are often located within a few miles. It was also feared that stones might get between the two tires. This has only occurred once, and in this instance both of the tires were destroyed. One of the frequent bills for tire repairs is due to side wall abrasions caused by striking the curbs. We like to get the buses as close to the curb as possible so passengers will have less trouble in boarding and alighting. Drivers, in attempting to get close to the curb, sometimes strike it because of the wide dual wheels. In order to take care of these abrasions, we have induced some of the tire concerns to build special tires with tread stock in the side walls, and in some instances heavy rubber beads have been put on.



This has resulted in a considerable increase in the tire life.

It was hoped, when the bus service was started, that by using good tires on the rear with their heavy non-skid markings, it would not be necessary to install chains on the dual wheels, but when the first snow storm was encountered it was found that when a bus was stopped going up heavy grades on an asphalt street it could not be started without chains. It was only necessary under such conditions to install a single 36 x 6 chain on the outer wheel. Nevertheless the chain problem is a big item in bus maintenance and should receive very careful study. The life of a chain in bus service is exceptionally short. After they are used for a single day they require considerable repair. The use of chains is hard on the tires. During two days they were kept on recently, fifteen tires were cut through and had to be scrapped. These were partly worn, but they would have been run for some time under normal conditions.

#### How SNOW FIGHTING IS CARRIED ON

When the snow gets about  $\frac{1}{2}$  in. deep, two automobile wreckers leave the inspection shop and start to equip the twenty-four buses on the lines with chains. It takes two wreckers close to four hours to equip these buses, as it is necessary to go to the ends of the lines, jack up both sides of the bus and loosen the wheel bolts because there is no room between the dual tires to put in the chains without loosening the wheels. The wrecker trucks are equipped with the same 36 x 6 tires, mounted on Budd Michelin steel disk wheels, the same as the buses. Thus, the extras that they carry will take care of the buses. They are also equipped with blocks, jacks and wrecking material, so that they can be used for either bus work or car wrecking. While these wrecker trucks are out putting on chains, they keep in close touch, by telephone, with the car dispatcher and call up when leaving the end of each line so that they can be reached easily for either bus calls or car troubles. It is found that the buses require far more minor adjustments and attention than street cars; in fact, one of the wrecker trucks is out almost all of the time either changing tires, making minor adjustments or going to the supply houses to secure parts. Although the first engines have made over 40,000 miles, it has not been necessary to change piston rings or rebore cylinders.

Cleaning of the buses has been kept to a high standard. They have been scrubbed inside and outside every third day, while the rear ends, windows and the floors are cleaned every night. Nevertheless, due to their being so close to the ground, splash from passing machines often keeps them spattered with mud in bad weather.

The body frames are made of steel and covered with a veneer of wood and sheet steel material. Some anxiety was felt at first as to how this material would repair after being damaged, but, although the buses have been struck

repeatedly by other vehicles, it has been found that this built-up material can be easily pushed back into place. The outer sheet is repaired by soldering on patches.

### Motor Bus Organizations

**NATIONAL MOTOR TRANSPORT ASSOCIATION.** President, Patrick H. Long, secretary and counsel, Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; treasurer and secretary, E. B. Barrett, Pisk Building, 22 West Fifty-seventh Street, New York, N. Y.

**ARIZONA MOTOR TRANSPORTATION ASSOCIATION.** President, D. C. O'Neil, Douglas, Ariz.; secretary, E. A. Jones, 127 North Central Avenue, Phoenix, Ariz.

**MOTOR CARRIERS' ASSOCIATION.** President, W. E. Travis, president California Transit Company, San Francisco, Calif.; secretary, James G. Blaine, 1299 Bush Street, San Francisco, Calif.

**CONNECTICUT MOTOR STAGE ASSOCIATION.** President, Patrick Hoady, secretary and counsel, Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; secretary, Edward J. Glides, treasurer, Congress Taxi Company, Danbury, Conn.

**FLORIDA BUS ASSOCIATION.** President, operator, A. D. Hartzell, president and general manager, White Bus Line, Tampa, Fla.

**INDIANA MOTOR BUS OWNERS' ASSOCIATION.** President, H. E. Johns, general manager Johns Bus Lines, E. C. Porte, Ind.; treasurer, W. E. Reentschler, manager Indiana Motor Bus Company, Plymouth, Ind.

**INDIANA BUS OWNERS' ASSOCIATION.** Secretary, Stanley Pitchford, Indianapolis, Ind.

**GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION.** President, R. A. Harrison, Bainbridge, Ga.; secretary, W. M. Riley, Deatur, Ga., 25 West Peachtree Street, Atlanta, Ga.

**IOWA BUS ASSOCIATION.** President, H. A. Pomeroy, Cedar Falls, Iowa.

**MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION.** President, E. Foster Moreton, president Moreton Trucking Company, Third & Howard Streets, Detroit, Mich.; secretary, H. H. Hardy, Lansing, Mich.

**MINNESOTA MOTOR BUS ASSOCIATION.** President, Rodney S. Dummick, president Touring Car Bus Company, 29 Seventh Street, North, Minneapolis, Minn.; secretary, Earl F. Jackson, Endicott Arcade, St. Paul, Minn.

**NEW JERSEY BUS TRANSPORTATION ASSOCIATION.** President, John Morning, 108 Warren Street, Newark, N. J.; secretary, Harry Buessert, 79 Madison Street, Guttenberg, N. J.

**NEW JERSEY AUTO BUS ASSOCIATION.** President, George F. Seymour, Jr., 29 Clinton Street, Newark, N. J.; secretary, George L. Cowan, 29 Clinton Street, Newark, N. J.

**AUTO BUS ASSOCIATION OF NEW YORK STATE.** President, Alan V. Parker, Niagara Falls, N. Y.; secretary and treasurer, James J. Todd, president Rochester Bus Lines Advertising Corporation, 129 Vermont Avenue, Rochester, N. Y.

**OHIO MOTOR BUS ASSOCIATION.** President, R. E. McCallum, Ohio Motor Bus Company, Columbus, Ohio; secretary, C. J. Randall, 419 Majestic Building, Columbus, Ohio.

**PENNSYLVANIA MOTOR BUS OWNERS' ASSOCIATION.** President, Frank Mertz, treasurer White Transit Company, Plymouth, Pa.; treasurer, W. J. Emerick, president Emerick Bus Lines, Bellefonte, Pa.

**WASHINGTON AUTO TRANSPORTATION ASSOCIATION.** President, A. C. Ellington, Des Moines Auto Company, Seattle, Wash.; secretary-manager, Erven H. Palmer, Terminal Building, Seattle, Wash.

**WISCONSIN MOTOR TRANSPORTATION ASSOCIATION.** President, A. C. Homan, Menasha, Wis.

We have endeavored to keep our cost figures accurate. Just now we are segregating them into the maintenance cost on each bus and the depreciation separately. A depreciation is obtained on the mileage on use of motor vehicles and on other. A depreciation is given us the time being by cost, by the layers of an kind, and then the depreciation and the making up. The figures and records will not be too far from the time to reach the value of the material and apparatus. There will be no trust, lift us from the wheels and show us the right road, whether that road leads us into a land of Buses, or whether it takes us back to the head of exclusive electric railway service.

For the present we can only say that we know the bare cost more to operate per passenger carried; that they will not handle the crowds; that they are less reliable; that they really move faster; that they are more flexible, and that in spite of the crowding, poor ventilation, and harder riding, there is a popular clamor for them that must be met, and met by the established street railways.

But of the future, oh, that we could look with wisdom through the years that lie in waiting! Who knows but the public demand of today may again swing to the modern electric car, carrying to the scrap pile the vast investment now going into the passenger bus. Already, along the ice-paved streets of our own city, there come mirrors from the people, who depend upon us for transportation, that the bus will only do in an emergency. We can only move with care lest we find a dangerous place in this Bus Pathway that may enmesh us in a tangled transportation web of financial loss. Therefore, I repeat, just as the public demands bus transportation, just so it should be furnished by us, but just so must the public pay the full cost, including amortization of the investment.

### California Motor Carriers' Association Elects Officers for 1923

AT THE annual meeting in San Francisco on Dec. 13, 1922, the California Motor Carriers' Association elected the following officers for the year 1923: President, W. E. Travis, president California Transit Company, San Francisco; first vice-president, Charles Wren, Pickwick Stages, Northern Division, Los Angeles; second vice-president, E. H. Howell, Motor Transit Company, Los Angeles. Other members of the board of directors are: Burr P. McConaha, Eureka-Crescent City Stage Line, Eureka; J. P. Walling, Valley Transit Company, Madera; E. J. Thompson, Anchor Stage Line, Fresno; and H. W. Regan, Peninsula Rapid Transit Company, Burlingame. H. W. Regan was elected treasurer and James G. Blaine secretary. The office of the California Motor Carriers' Association is located at 1299 Bush Street, San Francisco.

### Ohio Bus Men Draft Legislative Program

PLANS for obtaining fair legislation for motor bus interests of Ohio were made at the convention of the Ohio Motor Bus Owners' Association held at the Chamber of Commerce in Cincinnati on Jan. 5.

Although a bill regulating taxation of motor buses was drawn up to be presented to the Ohio State Legislature, its provisions were not made public because several changes are to be made in the measure. A policy of co-operation with state and city authorities was adopted. It was made known that the association would favor a state tax on motor buses, but would demand a voice in preparing the taxation bills.

Traction interests throughout the state were charged by the members with framing taxation bills for the state Legislature and for many of the cities and towns. The so-called "model bill" regulating taxation of buses which will be presented to the Legislature in March was termed one of the traction accomplishments. Passage of this bill, association members declared, would spell ruin for the industry, as the proposed tax of 1½ cent per ton-mile for solid-tire buses and 1 cent per ton-mile for pneumatic-tire buses provided for in the "model bill" would equal the net revenue of the bus.

The association went on record as favoring a liberal state tax which may amount to as much as \$1,000 a year per bus, according to the mileage or the number of cities it goes through.

The convention was divided into two sessions and was attended by 100 bus owners from all parts of the state. In the afternoon the delegates were taken on an automobile tour of the city, after which they were the guests of the Cincinnati association at a dinner. The major part of the evening session was devoted to the subject of taxation and regulation as set down for the bus operators. Each member present was called on to give his views on the subject and to relate his experience. Every speaker had tales of fights over taxation and against extermination.

Sylvester Hickey, Cincinnati, who has represented Cincinnati bus interests, was chairman of the meeting. Speakers included W. C. Culkins of the Cincinnati Chamber of Commerce; R. E. McCollum of Columbus, president of the state association; J. B. Cox of Alliance, vice-president; E. N. Young, Toledo, treasurer, and C. J. Randall, Columbus, secretary.

The support of the two Cincinnati automobile associations was pledged through communications from officials of each club.

It was announced that James J. Fitzpatrick, formerly manager of the Cincinnati Motor Club and now a practicing attorney, would be the attorney for the Cincinnati branch of the association. He succeeds Sylvester Hickey, who has been appointed assistant prosecuting attorney of Hamilton County.

The convention was arranged by the

board of governors of the state association, which consists of E. C. McAtee, Toledo; Judge R. W. Sanborn, Cleveland; M. E. Blackburn, Martins Ferry; F. J. Mayo, Hamilton; C. Stoner, Xenia, and J. S. Carlisle, Columbus.

The headquarters and office of the state secretary have been moved from 562 East Mound Street to 419 Majestic Building, Columbus, Ohio.

### Georgia Association Holds Annual Meeting in Atlanta

A MEETING of the Georgia Motor Bus and Transportation Association was called to order at the Piedmont Hotel, Atlanta, Ga., on Jan. 15 and extended through Jan. 16, with B. A. Harrison of Bainbridge, the president, in the chair.

Various matters of interest to the motor bus owners of the state were discussed and a progressive program along several lines was adopted by a unanimous vote. A resolution that the publishers of *Watts Railroad Guide* be furnished with a list of the operators of automobile bus lines in the state who are members of the association, and that their full schedules in detail will be obtained for publication in the *Guide* each month was adopted. Mr. Watts, the publisher, was present and made some valuable suggestions, among them that the schedules would be placed in a Motor Bus section of the *Guide*, showing time of arrival and departure at each station, giving railroad connections and mileage of the bus route, all properly indexed and as complete in detail as the railroad schedules that are now published in the same *Guide*. This will enable the traveler to figure out his complete schedule before leaving home, and by using motor buses save much time in his itinerary. The association also plans to place a map of the state in this *Guide*, showing all bus routes, indicating in heavy dark lines the routes which are covered by members of the association, and in light lines show the bus lines which are operated by those who are not members.

Considerable discussion was given to the best method of securing new members for the association. There are about fifty operators of buses in the state now who are not members. Because there are many problems coming up constantly that can better be solved by a united body than individually, the present membership desires that all bus owners of the state share the advantages and privileges of membership in the state association.

It was decided that the secretary be instructed to send each member of the association the names of operators in his territory who are not now members, and in this manner every present member of the organization will take part in a concerted state-wide drive for additional memberships by covering his own locality.

While no definite plans were made, the question of legislation was discussed. The propaganda against motor

buses from certain quarters is recognized, but it is felt that as the buses serve a useful purpose, save much time for many people, furnish an economical means of transportation and are helpful in all aspects, the association and its members could depend on receiving justice at the hands of the lawmakers. The feeling was that while they must be on the alert in looking after the interests of its members, they would get a fair deal from the Legislature.

No election of officers was held, so that the present officers continue to hold their respective places. These officers are: B. A. Harrison of Bainbridge, president; C. P. Vaughn of Cumming, vice-president; W. M. Riley, Decatur, secretary and treasurer. The meeting adjourned on the afternoon of Jan. 16, to meet again in Atlanta on May 15 and 16, 1923.

### New Jersey Association Meets

THE annual meeting of the New Jersey Bus Transportation Association, held in Achtel-Stettens Hall, Newark, on Jan. 30, was attended by representatives of bus lines from several counties of the state. This association was formed in June, 1922, and has a membership of about 300.

The business session was preceded by a discussion in which legislative matters and plans for increasing the membership and efficiency of the organization were the chief topics. George L. Record, Jersey City attorney and general counsel for the organization, took a prominent part in the discussion. It was agreed that constant vigilance must be maintained in watching the legislative program at Trenton in order to safeguard the interests of the bus industry.

E. B. Burritt, manager of the National Motor Transport Association, outlined the aims and purposes of the national association, and told of the activities and procedure of other state organizations. The matter of employing a salaried secretary-manager was discussed and laid over until a future meeting.

A resolution commending Governor Silzer for the stand he has taken toward the industry and expressing the utmost confidence in his administration was adopted. The meeting also adopted a resolution urging upon the members a greater regard for the safety of the public.

Mr. Gallagher was tendered a re-nomination as president, but declined because of the pressure of other business. John Morning of the Market Street lines, Newark, was unanimously elected president and the following other officers were chosen:

First vice-president, Charles J. Gallagher, Jersey City; second vice-president, John Yates, Newark; third vice-president, Michael P. Fofge, Lodi; fourth vice-president, Benjamin P. Huff, Paterson; secretary, Harry Buesser, Hillside Bus Lines, Gutenberg; treasurer, Curt R. Wothke, West New York; general counsel, George L. Record, Jersey City.

# News of the Road



## Bus to Supplant Trolley in Newburgh

### Local Railway to Replace All Trolley Cars With Buses on May 1—Factors Causing Change Are Outlined by City Manager and Railway Official

THE Orange County Traction Company, Newburgh, N. Y., in the fall of 1922 replaced its crosstown railway lines with motor buses and organized a subsidiary, the Newburgh Public Service Corporation, to conduct its bus business. At that time it was stated that the railway was planning more extensive use of the bus in place of trolleys. In the November, 1922, issue of BUS TRANSPORTATION the supplanting of the company's entire railway system by motor buses was forecasted. Recent developments in Newburgh bear out the accuracy of this prediction.

The Newburgh Public Service Corporation has been granted a franchise by the Council to operate buses in place of electric cars over its 6-mile route from Newburgh to Orange Lake, which passes through one of Newburgh's suburban residential districts. A similar application has been made to the State Public Service Commission.

But of far greater significance is the fact that the Orange County Traction Company is also preparing to turn its main city line over to the Public Service Corporation on May 1, 1923, which means that the city is now seeing the last of its trolley system. Since the first of the present year the company has been gradually getting rid of its trolley cars.

One of the things that has brought about this decision on the part of the company is the fact that the crosstown bus lines carried a total of 106,000 passengers during December of 1922, as against 47,000 carried by the trolley cars on the same lines in December of 1921. In addition to the increased traffic, there has been a reduction of about 37 per cent in the cost of operation.

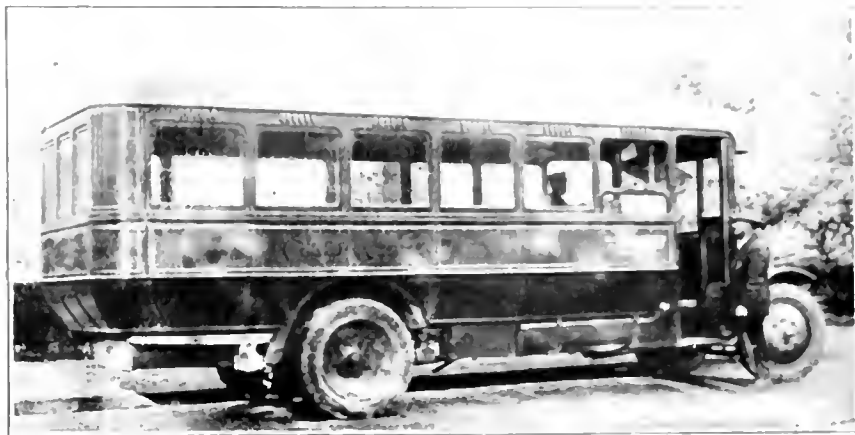
In December, 1921 the crosstown railway lines were tied up for four days due to snow storms. During December of 1922, during which three times as much snow had fallen as in the previous year, not one bus was tied up more than five minutes. It was not necessary to put on crews of men to clear the streets so that they could get through. A snow plow, purchased for the purpose, preceded the first bus in both directions. Unquestionably the large volume of snow that had fallen this winter has had a lot to do with showing up the advantage of the bus as a public carrier. While Broadway has been lined with crowded, stalled trolley cars, the cross-

town buses have continued to operate without trouble.

The Newburgh Public Service Corporation operates eight Fifth Avenue Coach type "J" buses on its lateral lines. Conclusive evidence that the bus is to supersede the trolley in Newburgh is the fact that the company has placed an order for seven "J" type buses with the Fifth Avenue Coach Company, delivery to be made before May 1. (Through error these were reported as

or. When a 100,000-acre tract of land is sold, the 100,000 people at the fair, the only state of the fair, is a sufficient factor to be better understood. Similarly, if the makers and buyers of a quarter of the riders each of the total state does. This would make a total of 2,000,000 people entering. No change each year.

"V. for matter, at the number of stores and theaters, there are in Newburgh. They can't see how they at all be made to pay. They don't realize that they and the bus they came in on are two of the reasons. Now that the Orange County Traction Company is going over to the bus system entirely,



*One of the Fifth Avenue single-deck buses in Newburgh service.*

double-deck buses on page 60 of the January, 1923, issue.)

That Newburgh is a bus city, City Manager W. Johnston McKay proves in the following remarks made to a BUS TRANSPORTATION representative: "According to figures compiled and submitted to the New York Public Service Commission by a bus line operating between Newburgh and Marlborough, when seeking permission to extend its franchise, a total of 165,000 passengers were brought into Newburgh from the northern direction. When one stops to realize that this is almost five times the population of Newburgh, the importance of the bus as a commercial feeder to a city and its merchants can be better understood.

"The Newburgh-Marlborough line is the only line we have actual figures on, but it must not be forgotten that there are nine other lines carrying just as many riders into the city and forty lines which are carrying a smaller total. Thus it will be seen that the ten big lines bring a total of approximately 1,650,000 persons into Newburgh each

I think Newburgh is entitled to the credit of being the banner bus city in New York State, if not of many states."

Fred Berry, superintendent of the Orange County Traction Company and the Newburgh Public Service Corporation, says of the shift from trolley cars to buses:

"The change had to come. There is no comparison between buses and trolley cars. With the trolley system, when that happened to be a fire in any of the streets through which our tracks ran, it was a case of shutting down the system in that street, whereas now, if there is a fire in any of the streets our buses travel and are *hassle* littered the street, the bus merely detours, taking the next street. Passengers are not compelled to sit chafing under forced delay, or get out and continue their journeys afoot. Of course the difference in cost and simplicity of operation is the big thing from the standpoint of the stockholders, and that is all on the side of bus transportation. There are thousands of people in New

burgh riding in our buses who seldom or ever rode in our trolleys. This, we think is due to the fact that the buses are running more frequently than did the cars; there is little or no waiting now. When the snow isn't too deep the buses run to the street curbs taking on and letting off passengers. The advantages of the bus over the trolley are too numerous to enumerate at this time."

### Springfield Railway Receives Bus Permit

The Massachusetts Public Utilities Commission has granted the Springfield Street Railway a permit to operate motor buses within the territory served by that company. This privilege was sought owing to the demand for transportation service across the new Hampden County Memorial Bridge to connect with car lines in West Springfield, until such time as electric cars may be routed over the bridge. For that purpose the company has provided itself with two buses, a Selden, Model 52, seating thirty, and a White, Model 50, seating twenty-five passengers.

At a meeting of the transportation committee of the City Council the suggestion was made that the railway provide a complete service of electric cars and buses, displacing the present jitneys, which run largely in competition with the railway. President Wood of the street railway indicated a willingness to make such an arrangement, provided he could be assured that such competition would be abolished. This would open the way for a feeder service in co-ordination with the railway lines.

The independent bus operators, of whom there are thirty in the Springfield district, voice opposition to this plan, but as yet have adopted no definite measures for combating it. Their municipal licenses are granted for one year only, and will expire May 1.

### Toledo Extension Held Up

The plans for the establishment of bus service as an adjunct to the Community Traction Company's railway lines in Toledo, Ohio, have been blocked by objections raised in the City Council as to the manner in which the proposed extension would be financed. As stated in BUS TRANSPORTATION for January, 1923, the Council authorized the railway to issue \$30,000 of preferred stock for the purchase of four buses and the construction of a garage. This measure was later repealed. Several other plans were presented but at present the entire matter seems to be held in abeyance.

Street Railway Commissioner W. E. Cann recently was instructed to receive bids from private operators, who submitted proposals ranging from \$13.50 to \$26 a day, depending upon the value of the equipment. Mr. Cann estimates the cost of similar service if given by the street railway under the original plan to be \$17.38 a day.

## City-Wide Bus System Proposed for Los Angeles

Two Million Dollar Corporation Behind Petition—William G. McAdoo and Eastern Financiers Interested in Project.

PERMISSION to establish a motor bus system in Los Angeles, Calif., similar to those operated in New York City, Chicago, Detroit and other large cities, was sought in a petition presented to the City Council, Jan. 23, by Marco H. Hellman, president of the Merchants National Bank, and signed by William G. McAdoo, former secretary of the treasury, who represents Eastern business interests.

The buses, of the double-deck type, would operate in the congested district and run to all parts of the city, operating over thirteen routes and traversing 60 miles of streets. Mr. McAdoo is now a resident of Los Angeles and is counsel for the \$2,000,000 California corporation to be organized to operate the bus lines. The application is also signed by E. F. Simms and former Congressman Joseph L. Rhinock, both of New York. Mr. Simms is vice-president of the Sinclair Gulf Oil Company. The director and manager of the company is Richard W. Meade, for many years head of the Fifth Avenue Coach Company, New York, and also interested in the installation of similar service in St. Louis, Mo. (See BUS TRANSPORTATION for October, 1922, and January, 1923.)

The proposed fare is 10 cents, with a universal transfer system. The proposed buses would cover practically all territory reached by the present railway lines.

The petition pointed out that the buses would run in competition with the lines of the Los Angeles railway, although the fare would be higher than that on the railway; and that every passenger would have a seat in the buses. Each bus would seat fifty people. The system would employ 125 buses of the double-deck type.

Drivers, conductors and supervisors will be neatly uniformed. The petition states that the proposed bus system involves an expenditure of several million dollars and that the promoters would be willing to spend the money if the city of Los Angeles would guarantee it a fifteen-year franchise, allowing the city 3 per cent of the gross earnings in exchange for the franchise and the privilege of selling the bus system to the city after five years, provided the city should decide to buy it. The corporation also states it does not propose to sell any stock, as it is well financed to carry out its operations and agrees to pay the city a license fee for each bus placed in operation.

The corporation agrees to deposit with the city bonds to be fixed by the Council as evidence of good faith and the carrying out of its policies.

There would be two lines to the eastern part of the city, as it is pointed out in the petition that the congestion is

not so dense on that side of the city as it is on the rapidly growing western side. Routes selected do not correspond in every case with the service already supplied by the present street railway lines.

A motor bus ordinance in effect in the city at present prohibits the operation of buses in the congested district. While the motor buses could run just outside this zone, it was stated, a few of them would have to travel into the congested area in order to maintain a maximum efficiency. Terminals would be at the Plaza, with loops at intervals where buses would be turned around.

It is brought out in the petition that when a bus is stalled the other buses simply run around the stalled one, and no time is lost. It is also pointed out that the buses could be easily diverted in case of tie-ups caused by fires, accidents, etc. The application states that the double-deck bus is the only way for transient visitors to see the city. With the California climate passengers could sit on the top deck nearly the year round.

The City Council has referred the petition to the Board of Public Utilities for investigation and report.

### Deaths by Automobile Increase 41.2 per Cent in Four Years

The Department of Commerce announced recently that the returns compiled by the Bureau of the Census show that during the year 1921 10,168 deaths resulting from accidents caused by automobiles and other motor vehicles, excluding motor-cycles, occurred within the death registration area of the United States (exclusive of Hawaii), which area contains 82 per cent of the total population. This number represents a death rate of 11.5 per 100,000 population, as against 10.4 in 1920, 9.4 in 1919, 9.3 in 1918 and 9 in 1917. Between 1917 and 1921, therefore, the death rate per 100,000 population from motor vehicle accidents and injuries increased about 28 per cent. In the twenty-seven states for which data for 1917 are available the actual number of these deaths increased from 6,014 in 1917 to 8,492 in 1921, or 41.2 per cent.

### Jersey Bus Line Allowed to Parallel Railway

The New Jersey Board of Public Utility Commissioners has granted Samuel E. George the right to operate a bus line between Rahway and Carteret, N. J., over a route paralleling the electric line of the Public Service Corporation, in spite of the railway's opposition. Prior to this decision Mr. George had been forced to make a long and uncomfortable detour in order to avoid paralleling the railway tracks.

The commission's opinion holds that "it appears that these buses will afford convenient transportation . . . as well as affording more frequent service in the city of Rahway than the half-hour service now afforded by the . . . railway."

## St. Louis System to Be an Extensive One

United States Bus Transit Corporation Plans Embrace Modern Garages and Service Stations—Future Routes Considered.

THE United States Bus Transit Corporation, which about April 1 will begin the operation of motor bus lines in St. Louis Mo., and East St. Louis, Ill., as outlined in BUS TRANSPORTATION for January, 1923, plans to spend upward of \$300,000 immediately for the erection of garages.

Present plans call for three major structures, with one or two auxiliary garages. One large garage will be located in the west end, somewhere along the east and west line. A second will be at the southern end of the 8-mile Grand Boulevard route. The third major garage will be in the downtown section to serve the St. Louis-East St. Louis line. There will be auxiliary garages at the north end of the Grand Boulevard route and probably in East St. Louis. According to Augustus Barnes, financial representative of the company, the buildings will be the last word in garage construction. They will be one story in height and have a frontage of 200 ft. by a depth of 150 ft., or 30,000 sq. ft. of floor area. The most modern machinery will be installed so that any repairs needed can be made immediately. There will be plenty of repair pits under the parking spaces for the buses, so that mechanics may work with the least inconvenience in making repairs.

The structures will also contain club rooms for the employees, which will be equipped with billiard tables, bowling alleys and other devices to keep the chauffeurs and conductors amused while waiting to go on service.

Along every route there will be a number of service stations, so that if a driver runs short of gas, oil or has a puncture or minor breakdown he can have this need met with a minimum of delay. A rigid system of inspection will be installed so that when a motor bus leaves the garage it will be in perfect condition for service. Chauffeurs, conductors and mechanics will be held to a strict accountability for failure to live up to these rules properly.

Mr. Barnes told a representative of BUS TRANSPORTATION that the initial installation in the St. Louis service will embrace 140 double-deck buses, while twenty will operate in the East St. Louis district.

A feature of the St. Louis service will be the renting of motor buses to private parties. This service will be pushed to popularize the use of buses.

It is said that eventually the St. Louis service will include upward of 300 double-deck buses, and several additional lines will be installed as the demand grows. At present the company officials are studying the possibility of extending the Grand Boulevard line northward along Twentieth Street to O'Fallon Park and southeastward

along Kansas Street and Vermont Avenue to connect with the Bellefontaine Street car line near Roberts Street. These extensions would tap rather populous sections of the city that are at present somewhat distant from street car service.

## Three Killed in Seattle Bus Accident

On Dec. 30, a municipal auto bus, driven by Floyd Perry, and operating between the downtown district of Seattle, Wash., and Carleton Park, collided with a small car, driven by Henry Albrecht, on the West Wheeler Street bridge, hurling the bus through the guard rails and killing three, including the driver.

As a result of the accident, claims against the city totalling \$42,000 have been filed. Charges of manslaughter brought against Albrecht were dismissed. Evidence from the Coroner's office indicated that the bus was traveling at a speed of 30 m.p.h. and the Albrecht car 20 m.p.h.

As a result of an investigation by the Public Utilities Department heavier bulkheads have been built, heavy guard rails installed, and a new system of lighting the bridge installed at the point where the accident occurred.

## Crosstown Bus Service for East St. Louis

The East St. Louis City Railway will establish crosstown motor bus service on March 15 along Twenty-fifth Street from Lansdowne to Missouri Avenue, according to a recent announcement made by W. H. Sawyer, president of the company.

The line will serve as a feeder to the Lansdowne, Jones, Park, State Street, Cleveland Avenue and Broadway car line, and will be operated as part of the railway's service. The suggested rate of fare is charged on the street cars will prevail and transfer will be made without extra charge.

Three twenty-five passenger buses will form the initial equipment. Three White Model 59 chassis and one Kamm body have already been purchased. In announcing the company's plans Mr. Sawyer stated that while the installation of buses is in the nature of an experiment, in his opinion they would continue in service for some time. It was found inexpedient for the railway to extend its lines at this time, and the proposed crosstown bus service is regarded as a solution to a problem that has long confronted East St. Louis. The local Chamber of Commerce was active in furthering a movement for this service.

## British Bus News Summarized

Much New Legislation Is Proposed—Establishment of New Bus Lines Is Under Consideration—Safety First Competition Contest Is Being Conducted by London Safety First Council—Two Recent Publications Reviewed

A PROPOSAL that the drivers of all motor vehicles pass tests before being licensed will come up in the coming session of Parliament, at which the Town Council of Stoke-on-Trent is promoting a bill carrying such provisions. At present anybody can get a license. It seems doubtful, however, whether the Stoke corporations bill will be passed, as the contention will no doubt be put forward that such a change should be made by general legislation affecting the whole country, and not by a private bill affecting only one town.

Elaborate arrangements are being made for means of access both by rail and road to the British Empire Exhibition, which is to be held at Wembley, on the northwestern outskirts of London, next year. In regard to bus and motor car traffic various new roads are being made and existing roads widened. A sum of £135,000 is being spent on road construction, of which the Ministry of Transport is providing half out of the national road fund, which derives its money from road motor vehicle taxation. A "transport park" will be provided, consisting of an open space of five acres, to accommodate 130 motor coaches and buses and 350 touring cars.

The London Safety First Council proposes during 1923 to hold a freedom from accident competition, for which drivers of all classes of vehicles will be eligible. There will be 350 badges of merit for drivers whose records qualify

them to receive these awards, and prizes of 10s. each will be awarded to 100 out of the 350. The record as to freedom from accidents will be kept throughout the year.

A municipal interurban bus service between a terminus of the Rotherham Corporation Tramways and a terminus of the Doncaster Corporation Tramways has been approved by the Minister of Transport. The scheme was put forward by the Rotherham Corporation.

A proposal by the Bradford Town Council to run railless trolley cars outside the boundaries of the city has been considered by a conference of neighboring local authorities. It appeared that there was a consensus of opinion that there was not sufficient demand for the scheme.

The Greenock Town Council is seeking authority to borrow £30,000 for the establishment of motor bus services and £10,000 for the purchase of land and the erection of the necessary buildings.

The watch committee of the Stoke-on-Trent Town Council is enforcing an order that buses must have seating accommodation for all passengers.

With the opening of the new year came the first issue of a monthly journal called *Roads and Road Construction*, dealing with road engineering and development. Technical and practical articles occupy most of the space in the first issue.

A book entitled "The Metropolitan



"Traffic Manual," by Carol Romer, M.A., has been officially issued under the auspices of the Metropolitan Police authorities. The London law as to street traffic, licensing of vehicles, etc., differs from that in the rest of the country, and besides often appears very complicated. While the book embraces all enactments relating to street traffic in London, it is so arranged as to be readily usable as a reference book. Local by-laws as to motor traffic are adequately explained, and even the laws relating to air navigation receive due attention.

The profit of the National Omnibus & Transport Company for the year ended Oct. 31 last, before providing for depreciation, was £20,170, making with the amount brought forward £39,782. Out of this, £18,000 is transferred to depreciation of rolling stock account, £1,926 to writing off good will, and the remainder is carried forward. The results for the year were affected by exceptionally bad weather of last summer.

The London General Omnibus Company on Jan. 1 signed a check for £245,923 in payment for the renewal of licenses for its buses for the year 1923.

The watch committee of the Scarsborough Council has proposed new rules, one of which is that when application is made for licenses, specifications and drawings of the vehicles proposed to be licensed are to be submitted. A bus with entrance at the front must have an exit at the rear. There is to be a restriction on the licensing of double-deck buses. It is also proposed that buses must have pneumatic tires or others of such a resilient nature that vibration is reduced to a minimum. Buses must be operated only over routes approved by the Council.

The term "jitney" is not used in England, but protests are being raised on behalf of bus companies that carry on regular services all the year around against what are called pirate buses. These pirate buses cut in at intervals when the weather is good or when from any other cause extra traffic may be expected. There is still another form of the business which may prove extremely valuable to the small operator but which will be anathema to the regular bus company, should competition arise. This takes the shape of a lorry which can in a few minutes be converted into a bus by putting a passenger carrying body onto it. If the goods haulage man finds business slack and if he sees a prospect of getting passengers, he quickly can convert his vehicle into a bus. To settle matters properly, it would appear that some general legislation is necessary. No uniform regulation for the whole country can be expected from the multitudinous local authorities who control the licensing of motor vehicles.

The London General Omnibus Company recently conducted experiments in its shops to determine how far an omnibus may tip without overturning. In the accompanying cartoon, *London Punch* applied the idea to street service.



From *London Punch*

"No Cause for Alarm"

Competition between rival bus owners serving the Garw Valley in South Wales resulted in allegations that running times were being disregarded. The Ogware and Garw Urban District Council, after a hearing on the case, appointed a committee to confer with those concerned, and to fix on a definite time schedule. If the time-table when prepared, is not adhered to, the Council proposes to suspend the licenses for the vehicles, and to call in an outside company to provide a bus service.

### Fare War in Jersey

The action of the Southern Boulevard bus men of Jersey City in announcing a fare increase from 5 to 10 cents effective Feb. 1, precipitated a fight between the Boulevard Commission and the bus men which is still raging as this issue goes to press.

About sixty buses are operated over this route from Journal Square, Jersey City, to Bayonne. The bus men are organized under the name of the South Hudson Boulevard Bus Owners' Association and the pooling system has been in use for some time. The present fare is 5 cents from Jersey City to the Bayonne line and 5 cents from the Bayonne border to the terminal at Bergen Point. The bus men proposed to charge a straight 10-cent fare for any part of the distance between terminals and posted placards in their buses announcing this increase.

This move did not meet with the approval of the Boulevard Commissioners, who on Jan. 28 served summons on the bus owners to show cause at a special meeting held on Jan. 31 why their operating permits should not be revoked. At this meeting final notice was served upon the bus men that unless they receded from their present position before Feb. 2, they would be ruled off the boulevard. The bus owners then secured a writ of certiorari, taking the case to the Supreme Court for review and tying the hands of the commission for the present, at least.

### Plans for Newburgh-New York Line Under Way

At a recent meeting of the Newburgh (N. Y.) City Council, a franchise was granted the Hudson Transit Corporation, controlled by Didsbury, Aber & Didsbury, Walden, to extend its bus service, now running south as far as West Point, to the village of Nyack. This is to be the start of a Newburgh-to-New York bus route. The route will be extended south to Weehawken, N. J., as soon as the corporation can increase its equipment.

The route and rate of fares proposed are: From Newburgh to Cornwall, 20 cents; Cornwall to West Point, 20 cents; West Point to Highland Falls, 10 cents; Highland Falls to Fort Montgomery, 15 cents; Fort Montgomery to Bear Mountain Park, 25 cents; Bear Mountain Park to Iona Island, 15 cents; Iona Island to Jones' Point, 15 cents; Jones' Point to Tompkins Cove, 15 cents; Tompkins Cove to Stony Point, 15 cents; Stony Point to West Haverstraw, 15 cents; West Haverstraw to Haverstraw, 10 cents; Haverstraw to Rockland Lake, 25 cents; Rockland Lake to Upper Nyack, 15 cents; Upper Nyack to Nyack, 10 cents.

During the spring season two round trips daily will be made. The buses will leave Newburgh at 7 a.m. and 2 p.m. and will leave Nyack at 10:45 a.m. and 5:15 p.m.

The petition stated that the Hudson Transit Corporation is capitalized at \$100,000; owns and operates fourteen modern buses, and has contracted for five additional buses of latest design and construction, for immediate delivery. The company recently acquired a site in Mill Street in Newburgh on which a large bus terminal and repair shop will be erected.

### Sunday School Buses the Latest

Motor buses and touring cars each Sunday bring 100 persons to Sunday school at the Madison Township Baptist Church in Lake County, 40 miles east of Cleveland.

No other rural church in Ohio, so far as is known, is covering its parish systematically each Sunday with organized bus routes. It is said, however, that the scheme is being used by some Iowa rural churches.

The buses are owned by private individuals, and the services of the machines on Sunday are engaged by the church at the same rate the school board pays. The other cars are donated by their owners, one of whom is the Rev. R. R. Tinkham, pastor of the church.

The bus lines reach 4 miles from the church in all directions. They have extended the area of the parish to cover an area 8 miles square. The bus service was commenced last January. Since then it is stated, the regular attendance at the Sunday services has increased from less than 100 to nearly 200.



### Tabular Presentation of Recent Bus Developments

Company	Address	Address
<b>Incorporations</b>		
Schipp Auto Bus Line Co.	Kingston, N. Y.	Kingston, N. Y.
Motor Transit Co.	Aberdeen, S. D.	Aberdeen, S. D.
Layne Bus Co.	Decatur, Ill.	Decatur, Ill.
Seaside Transportation Co.	Atlantic City, N. J.	Atlantic City, N. J.
Columbia-Franklin Bus Co.	Nashville, Tenn.	Nashville, Tenn.
East Fayette St. Bus Co., Inc.	Baltimore, Md.	Baltimore, Md.
Inter-City Bus Transportation Co.	North Bergen, N. J.	North Bergen, N. J.
Red Line Bus Co.	Greenwood, Miss.	Greenwood, Miss.
Shawneetown-Marion Bus Co.	Harrisburg, Ill.	Harrisburg, Ill.
<b>Applications Filed</b>		
Charles Potter	.....	McIntosh to Lowell, N. Y.
Edgar C. Miller	.....	Port Royal to Burnham, Ill.
Whitehall Auto Bus Co.	.....	Whitehall, N. Y.
John Fabia	.....	Farmington to Mount Kisco, N. Y.
W. N. Birney	.....	West Springfield, Mass.
Genesee & Rock Island Motor Bus Co.	.....	Genesee, N. Y.
Ventura Transportation Co.	Ventura, Cal.	Ventura, Cal.
C. D. Gulick	.....	Los Angeles to Sanland, Cal.
Chester Auto Bus Co.	Chester, Pa.	Chester, Pa.
Packard Stage Lines	.....	Los Angeles to Lancaster, Cal.
Louis Hansen	.....	Ukiah to Potter Valley, Cal.
U. L. Gladfelter	East Berlin, Pa.	East Berlin to Hanover, Pa.
E. T. Bransfield	595 Monroe Ave., Elizabeth, N. J.	Hanover to York, Pa.
C. E. Grooms and H. Brooks	Chauumont, N. Y.	Elizabeth, N. J.
A. V. Casner	Lindenau, N. J.	Canton to Gouverneur, N. Y.
Chester Yoder	.....	New Brunswick to Lindenau, N. J.
City Transportation Co.	Tacoma, Wash.	Belleville to Lewistown, Pa.
Hudson Transit Corp.	Walden, N. Y.	Tacoma to Regent's Park, Wash.
Detroit Motor Bus Co.	Detroit, Mich.	Newburgh to Newk, N. Y.
W. G. McAdoo, as counsel	Los Angeles, Calif.	Extension Lafayette Blvd. Los Angeles
<b>Permits Granted</b>		
Ernest E. Kniss	Joliet, Ill.	Fort Seward to Zenia, Cal.
Chicago & Joliet Transp. Co.	.....	Lockport to Statesville, Ill.
E. J. Thompson	.....	Kerrman to Fresno, Cal.
G. E. Jacobus	.....	Mountain Lakes to Denysville, N. J.
J. C. Atkinson	Camden, N. J.	Camden to Audubon, N. J.
Reo Motor Bus Line	.....	Danville, Ill., to Crawfordville, Ind.
Midland Bus Co.	.....	Dyersville to Taylorville, Ill.
Barney Hughes	.....	Paterston to Midvale, N. J.
F. & C. Riley	.....	Paterston to Midvale, N. J.
D. W. Renfro	.....	Lolson to San Juan High School, Cal.
R. R. Young	.....	Stockton to Carlin, Cal.
Henry Crocker	.....	Manitowish to Appleton, Wis.
James H. Ransome	.....	Big Pine to Deep Springs, Cal.
Claude L. Scott	Corinth, N. Y.	Amsterdam to Ballston Spa, N. Y.
<b>Applications Denied</b>		
Collinger & Miller	.....	Los Angeles to Big Bear Lake, Cal.
Compton Transportation Co.	.....	Huntingdon Park to Pasadena, Cal.
George W. Bush & Sons Co.	.....	Wilmington, Del., to Chester town, Md.
<b>Lines Started</b>		
Jennings & Moore	Clarksdale, Miss.	Clarksdale to Glendora, Miss.
Leonard Dickinson	Owego, N. Y.	Owego to Binghamton, N. Y.
Northern Valley Bus Line	.....	Nyack, N. Y. to Englewood, N. J.
J. H. Awwiller	Ashland, Ohio	Ashland to Mansfield, O.
Weisberg & Gordon	.....	Freehold to Hightstown, N. J.
Vermilion County Motor Bus Co.	.....	Danville to Sudell, Ill.
Bryant Bouslog	Newcastle, Ind.	Newcastle to Connersville, Ind.
R. C. A. Dickey	.....	Oakwood to Lima, Ohio
Ritter Motor Bus Co.	Bloomington, Ill.	Bloomington to Pontiac, Ill.
Russell Transportation Co.	Ilion, N. Y.	Ilion
W. A. McConnell	.....	Springfield to South Charleston, Ohio
James Hanlon, Jr.	Passaic, N. J.	Passaic
G. J. Merritt	San Marcos, Tex.	Brazos to Austin, Tex.
W. Farrars	Seooba, Miss.	Moridian, Miss.
Bergman & Shosie	427 W. Superior St., Duluth, Minn.	Duluth to Eveleth, Minn.
Arthur Seagel	.....	Ayer to Groton, Mass.
Four States Motor Bus Interurban Line	.....	Texarkana to New Boston, Tex.
Red Star Line	.....	Texarkana to Shreveport, La.
A. L. Cornman	.....	Davenport to De Witt, Iowa
John Lobeck	3403 Thirty-Sixth St., Elmhurst, N. Y.	Flushing to N. Y. City
Reo Motor Bus Co.	.....	DeKalb to Geneva and St. Charles, Ill.
Service Motor Co.	DeKalb, Ill.	DeKalb to Dixon, Ill.
W. H. Mertz	.....	Kent on to Lima, Ohio
Chicago, North Shore and Milwaukee Ry.	.....	Kenosha, Wis., to Waukegan, Ill.
<b>Lines Proposed</b>		
Smith Bus Line Co.	Batavia, Ill.	Aurora to Elgin and Aurora to Big Rock
Mark Mitschum	Detroit, Mich.	Lansing, Mich.
Reliable Motor Bus Line	Clinton, Iowa	Shelfield to Keosau, Ill.
John Veal	.....	Rome to Callhoun, Ga.
Rapid Transit Bus Co.	Jersey City, N. J.	Lizbeth to Plainfield, N. J.
William Allen	West New York, N. J.	Wichawken and Union Hill, N. J.
Packard De Luxe Motor Bus Co.	.....	Chicago to St. Louis
George Karraides	Des Moines, Iowa	Des Moines to Nevada, Iowa
Cincinnati, Toledo & Columbus Transportation Co.	Dayton, Ohio	Dayton to Columbus
Bradfield & James	Greeley, Col.	Dayton to Hamilton
Glendale Motor Bus Co.	.....	Greeley
Leon Rymsha	Perth Amboy, N. J.	Glendale to Los Angeles, Cal.
Stanley Cornell	Canton, N. Y.	South River to Janesburg, N. Y.
White Freight Co.	Peoria, Ill.	Waddington to Canton, N. Y.
W. L. Richards	.....	Peoria to Galesburg, Ill.
William Cox	Union Hill, N. J.	Stockbridge to Mason, Mich.
Newberry County Bus Line	.....	Wichawken and Union Hill, N. J.
East St. Louis Railway Co.	E. St. Louis, Ill.	Newberry to Whitmore, S. C.
		E. St. Louis

## New Developments in City of Saginaw

Council Approves Saginaw Motor Omnibus Company Franchise. Citizens Committee Working For Resubmission of Joint Bus and Trolley Ordinance.

**T**HE CITY COUNCIL have adopted and have approved the grant of a vote for the year 1914 to the following persons, in consideration of the large sum of money contributed by them to the Municipal Council and to the various committees of the Council, that they may be eligible for election to the Council for the year 1915:—Mr. T. D. Fox, ex-governor of the State, and the new corporation of the city of a capitalization of \$500,000.—J. C. Wade, Mayor of the City, N. J.; Samuel Bergerl, Walter Kutzsch and George R. Edwell, New York City. It is noted that the system will be under the management of Mr. Wade and that Imperial buses will be used if the franchise meets with the approval of the Saginaw electorate.

This is one phase of the situation, which has been more or less complicated since the street railway suspended operations in the summer of 1921. Previous issues of BUS TRANSPORTATION have contained accounts of the developments leading up to the present situation. The litigation surrounding the street car bus franchise, which was submitted to the voters on Nov. 7, is still before the courts. Recently a movement has been on foot to resubmit this ordinance with modifications and the citizens' committee which has sponsored this plan will continue its activities along this line in spite of the Council's action.

## Rochester Buses Maintain Their Schedule During Bad Storm

During the night of Dec. 27 and the morning of Dec. 28, Rochester, N. Y., was visited by one of the worst storms that city experienced in years. Sleet followed by a foot of snow was accompanied by a 25-mile wind that at times reached the velocity of a 70-mile gale. Irregular service was maintained by the railways during the morning of Dec. 28 but at 3 o'clock in the afternoon, the street cars were virtually at a standstill. At 9:30 p.m., with all the available men and apparatus at work, the lines were opened up.

The following item regarding the performance of the East Avenue buses during the storm is taken from the *Rochester Democrat and Chronicle* of Dec. 29.

"Regular service was maintained on the East Avenue buses despite the storm. The buses were crowded to capacity during the rush hours, but were able to keep on regular schedule. Many people residing in the city used the buses, but the regular patrons were not inconvenienced, the officials of the bus line claimed. There were drifts of snow along the route to Pittsford, but the powerful vehicles experienced no difficulty in going through them. At no time were the buses off schedule."

### San Diego Railway Expanding Its Bus System

The motor bus equipment of the San Diego Electric Railway has been increased to five buses by the recent acquisition of a new Pacific twenty-nine-passenger eight-wheeler, of the same type as already owned by the railway. The recently established National City-Chula Vista bus feeder line is said to be proving so successful that General Manager Claus Spreckels is already planning an additional bus feeder route to the railway.

### Municipal Bus Line for Frisco Waterfront

A motor bus line along the San Francisco waterfront, to be operated as a part of the Municipal Railway, a scheme which has been under consideration for some time, now seems to be assured. At a public discussion held on Jan. 3 the San Francisco Board of Supervisors announced that steps would be taken at once toward the establishment of this service. The proposed route, which is 3½ miles long, will follow the Embarcadero past the Ferry Building to a northerly terminal at the foot of Hyde Street, which is also the terminal of the Golden Gate ferry. The construction of electric railway tracks over this route was decided to be impracticable because of the fifty railroad track crossings.

The present plan calls for a ten-minute service during most of the day and a twenty-minute schedule up to midnight for a 5-cent fare. Six buses will probably be required. The exact type of bus has not yet been determined, although one-man twenty-five-passenger coaches are said to be favored. There have been no new developments in connection with the proposed double-deck line for this route, to which reference was made in BUS TRANSPORTATION for July, 1922, page 403.

Need for transportation facilities along the waterfront has been recognized for years. At present there is almost a total lack of any sort of transit agency, so the bus line will undoubtedly be popular.

### Many Applications to Serve Hollywood District

The Board of Public Utilities, Los Angeles, Calif., has under consideration several applications and plans for the installation of bus service between Hollywood and the downtown district of Los Angeles. Chief Engineer Osborne of the board, after a study of the traffic situation and of the several proposals, recently rendered a report in which he recommended that the applications of S. C. Hamilton, W. F. Young and the Hollywood Motor Bus Company to provide this service over various routes be denied. Instead of granting permits to independent lines, the report urged the establishment of feeder lines by the Pacific Electric and Los Angeles Railways, which would

connect with the existing electric lines, and insure satisfactory transfer service. The whole matter is now in abeyance pending future hearings to be held by the board.

Commenting upon the general situation in its relation to bus service, the report of Mr. Osborne said:

All inadequate transportation service in certain sections of our city can be largely attributed to the phenomenal growth of the city. Competitive operation strictly in the same territory is disastrous, whether considered from the standpoint of financial returns to the operating companies or from the standpoint of service rendered the public. Rail carriers serving a district should be required to render such transportation as to meet the full demands of the public necessity and convenience before other service be inaugurated.

The application of the Hollywood Motor Bus Company may be affected by the recent appointment to the Utilities Board of E. F. Bogardus of that concern in that he will be prevented from passing upon an application in which he is interested.

### North Shore Installs Another Feeder Line

The Chicago, North Shore & Milwaukee Railroad recently opened a feeder bus line over a 16-mile route from Waukegan, Ill., to Kenosha, Wis. On Aug. 12, the railway first instituted bus service as a supplement to its rail system, when the Lake Geneva-Kenosha line was put into operation (see BUS TRANSPORTATION for September, page 512). Several other feeder routes are under consideration by the company.

The one-way fare over the Waukegan-Kenosha line is 45 cents and the running time one way is fifty-six minutes. Three twenty-seven passenger buses are operated on an hourly schedule.

### Popular Demand for This Bus Line

Ballston, N. Y., a village of 4,000, and Amsterdam, a city of 40,000, are connected by a 20-mile stretch of improved highway. At present the only means of public transportation between the two points is by a circuitous 32-mile trolley route by way of Schenectady. This condition will soon be remedied, however.

At a recent hearing before the Public Service Commission, C. L. Scott of Corinth, N. Y., was granted a certificate of convenience and necessity for the operation of bus service between the two places. The petition aroused more than a little interest in view of the strenuous opposition to the proposed line on the part of two railways. On the other hand, supporting the petition at the hearing, were delegations from Amsterdam's City Council, Rotary Club and Chamber of Commerce as well as many of the leading business men of the city. The bus service means to those who travel between Amsterdam and Ballston a saving of 12 miles journey, one and one-half hours in time and a small amount of fare.

### Railway's Franchise Provides for Bus Service

One of the clauses of a recent agreement made between the city of Vancouver, B. C., and the British Columbia Railway provides that wherever the electric service proves inadequate, the railway must put motor buses into service. Two bus lines are under consideration at the present time, but no definite action will be taken along this line until the city has made a careful survey of traffic conditions.

According to the agreement the present 6-cent fare is to remain in force for three years.

**P. R. T. to Buy Trolley Buses.**—The Philadelphia Rapid Transit Company has decided to purchase fifteen trolley buses for use on its Oregon Avenue route in Philadelphia.

**Minnesota Buses Christened.**—Bus owners in the Minneapolis section have recently adopted the plan of giving their buses distinctive names, such as "Miss Minneapolis," "Miss Virginia," etc. It is reported that this innovation is proving to be popular with travelers.

**Bus Service Follows Abandonment of Railway.**—Simultaneous with the beginning of the work of tearing up the rails of the Springfield & Washington Electric Railway between Springfield and South Charleston, Ohio, motor bus service was installed between the two points by W. A. McConnell, formerly ticket agent of the railway.

**Three-Year License Granted Gloucester Company.**—In accordance with the provisions of an ordinance recently adopted by the Gloucester (Mass.) Council, the Gloucester Autobus Company has been granted licenses for seven buses for a three-year period. The only condition imposed upon the company was the stipulation that present routes be maintained.

**Rockford Bus Service Discontinued.**—The Fay Motor Bus Company, Rockford, Ill., which carried thousands of soldiers and their relatives and friends to and from Camp Grant during the World War, has been denied an extension of its certificate of convenience and necessity, following an investigation by the Illinois Commerce Commission. After the war the Fay Motor Bus Company continued to operate buses to the factory districts, but its business has dwindled until the commission saw no reason for its existence being prolonged.

**Modern Ark to the Rescue.**—The Pellon Motor Bus Company, Rushville, Ill., when its operations were interrupted by the floods along the Illinois River, demonstrated its enterprise by chartering a motor boat and thus made connection with the motor buses where the latter were halted by the high water. By this combination, travelers between Rushville and Beardstown were accommodated without delay. This joint service was kept up as long as the river was out of its banks.



## Financial Section

### Wonder Tour of America Company Incorporated

The Wonder Tour of America Company, Cleveland, Ohio, has been incorporated with a capital stock of \$10,000, which will be materially increased later. The interests and officers of this company are identical with those of the Cleveland-Akron Bus Company, and the touring business initiated by the latter last year under the name of Wonder Tours will be taken over by the new organization. The scope of the tours is to be greatly extended, according to officials.

Last summer the Cleveland-Akron Bus Company conducted tours at frequent intervals to New York and return, taking in Washington, Gettysburg, Atlantic City and other points of interest. Trips to Florida were made in the fall in the same way.

### Bus Competition Curtails Train Service

Because motor bus and interurban competition has seriously cut its passenger business in certain localities the Pennsylvania Systems, Southwestern Division, effective Jan. 14, eliminated several trains operating between St. Louis, Indianapolis, Columbus, Cincinnati, Louisville, South Bend, Ind., and Peoria, Ill.

In the public announcement of the withdrawal of the trains by Benjamin McKenn, vice-president of the Southwestern Lines, motor bus competition, aided by the development of improved highways, is said to be one of the chief factors in forcing the curtailment of the service.

### Three California Lines Consolidate

Three extensive stage systems of California were recently consolidated into the Pickwick Corporation, which will serve as a holding company through which all three companies will be operated as individual branches. The systems consolidated are the Pickwick Stages, Northern Division, Inc., which operates about fifty cars over through routes connecting Portland and Los Angeles (1,185 miles); the Pickwick Stages, Inc., which operates about forty stages on runs between Los Angeles and San Diego, between San Diego and Imperial Valley and on branch lines in the Imperial Valley; and the Crown Stages which operates about thirty cars in Santa Ana and vicinity.

The offices of the Pickwick Corporation will be in the Union Stage Terminal at Los Angeles. The officers are Charles Wren, president; A. L. Hayes, vice-president; and Warren E. Libby, secretary and treasurer.

### New Jersey Company Sold by Receiver

George B. Astley has been appointed permanent receiver for the Boonton-Newark Bus Company, Inc., operating between Newark and Boonton, N. J. Mr. Astley was some time ago named custodial receiver upon the application of August Fraser, president of the company.

The sale of the assets of the defunct bus company, by George B. Astley, as receiver to Frank T. Forbes, Paterson, N. J., has been confirmed by Vice-Chancellor Church. By the terms of the sale Mr. Forbes pays \$1,000 and assumes a \$17,000 mortgage, covering the four buses of the company, and other liens and claims, making the entire cost of the line about \$20,000.

**Troy Company Changes Name.**—The name of the Troy Auto Car Company, Troy, N. Y., was changed to the Fifth Avenue Bus Company, Inc., at a recent meeting of stockholders.

**Crown Stages Sells Route to Pickwick.**—A. B. Watson, owner of Crown Stages, has requested the California State Railroad Commission to approve the sale of the Los Angeles—Santa Ana division to Pickwick Stages, Inc.

**Elizabeth Reports Greatly Increased Bus Traffic.** According to a recent report made public by the Elizabeth (N. J.) Board of Works, an average of sixty-three buses operating on the several lines of the city carried during 1922 a total of 14,946,672 passengers. In 1921 the total was 10,654,112 fares. The gross receipts for 1922 are reported as \$747,333.60, against a total of \$532,705.60 for the previous year.

**Fifth Avenue Bus Dividend Declared.**—The directors of the Fifth Avenue Bus Securities Corporation have declared a dividend of 16 cents a share payable Feb. 15 to stockholders of record Feb. 1. Payment of the dividend is conditioned on receipt by the company of a dividend of 50 cents a share recently declared on the stock of the New York Transportation Company.

**Bus Lines Must Obtain Permission to Quit.**—The Tidewater Bus Company, operating between Washington and Leonardtown, Md., and Washington and Rock Point, Md., which notified the Maryland Public Service Commission that it intended to cease operation of its lines, will have to get authority to do so from the commission. Commission officials have indicated that an order would not be passed authorizing the company to discontinue the line until an investigation has been made.

**Motor Transit Units to Be Consolidated.**—The Motor Transit Company, operating automobile passenger, baggage and express service in southern California, has applied to the State Railroad Commission for authority to join together all of its operating rights and to conduct the system as a unit. The company also requested the commission

to make the Motor Transit Company a subsidiary of the State Railroad Commission. The Motor Transit Company was organized by a consolidation of operating rights May 1, 1914, and its charter is for a term of years. Any rights claimed by the Motor Transit Company are claimed to be void and to be of no effect.

**Southwestern New York Competition Lessened.** The Red Star Line, which has been operating a line of buses in Chautauque County, between Jamestown, N. Y., and intermediate points, has been taken over by the Randolph Jamestown Bus Company. The Public Service Commission recently issued an order permitting the Randolph Bus Line of Jamestown to discontinue service between Kennedy and East Buffalo, as the service rendered between these points by the Randolph Jamestown company was shown to be adequate and there seemed to be no necessity for two competing routes.

**Colorado Company Fails.**—A voluntary bankruptcy petition was filed in the United States District Court, District of Colorado, on Dec. 28 by the Inter-City Automobile Lines, Inc. The petition lists liabilities amounting to \$41,744 and assets of \$30,000, the latter represented by five buses. The Inter-City Automobile Lines, Inc., commenced operation on June 18, 1922, between Denver and Colorado Springs, Pueblo and Canon City. The motor car equipment of the defunct company consisted of five Fageol twenty-passenger buses and five White sixteen-passenger buses. A new company, the Colorado Motor Way, Inc., has taken over considerable of the Inter-City Company's equipment and is employing many of its former drivers. Buses are being operated from Denver to Greeley, Colorado Springs and Canon City, and an additional line from Denver to Pueblo is under consideration.

## Book Reviews



### 1923 Hand Book of Automobiles

Issued by National Automobile Chamber of Commerce, 366 Madison Ave., N. Y.

Two hundred and twenty-nine models of motor cars are illustrated in the 1923 Hand Book of Automobiles, which has just been issued by the National Automobile Chamber of Commerce, 366 Madison Avenue, New York. The total number of car models and truck chassis listed is 834.

The book is a ready guide to the general appearance, price group and specifications of the principal models of automobiles and motor trucks being produced this year by the leading manufacturers in the United States who are members of the N.A.A.C. In the commercial division 251 chassis types are listed, with various body equipment.

This hand book of the automobile industry in America has become a general standard of reference.

# Bus Regulation



## Licensing Ordinances Held Invalid by Oregon Court

Justice McCourt, of the Oregon Supreme Court, recently handed down a written opinion in the case of E. W. Dent against Oregon City, a municipality, stating that motor bus or stage lines operating as common carriers that have complied with all requirements imposed by the Public Service Commission cannot be compelled by ordinance to pay license to any city through which they may pass.

This decision reversed the decree of Judge J. U. Campbell of the Clackamas County Circuit court, and also declared illegal the ordinance passed by the Oregon City Council regulating the operation of buses.

## Proposed Law Will Exempt All Buses in School Service

An amendment to the revenue act has been proposed by United States Senator Ransdell of Louisiana, which would exempt from taxation all motor vehicles used exclusively in the transportation of children to and from schools.

As the act reads at present the Commissioner of Internal Revenue declines to exempt from taxation the vehicles used in school service unless they are owned and operated by the school authorities. In almost every instance these vehicles are privately owned and the service is performed under contract with the school authorities. The object of this amendment is to free all such vehicles from taxation.

## Government Regulation for Quebec Buses

Government control of motor bus traffic in the Province of Quebec, Canada, will be effective March 1 in accordance with legislation made during the last session of the Legislature. The Lieutenant-Governor in Council is given wide powers in the matter of regulating bus traffic and a great many restrictions have already been adopted and more are said to be in the making.

The law, as amended last session, provides that the speed limit for a motor bus must not exceed 16 miles an hour, and, furthermore, that the government may require each motor bus to be equipped with an automatic device which will prevent it going over the speed limit of 16 miles. The Government may restrict the capacity and dimensions of all buses, regulate their construction, and also enact provisions for the protection of the public and roads. All buses must have pneumatic tires. They must, of course, have the provincial licenses.

The contention of the Government in making provision for checking the business is that these cars break up the main highways, and their continued use, except under careful and restrictive legislation, will mean that the money spent by the province on roads will have gone for naught.

The city of Montreal recently amended its charter so that a \$50 yearly tax might be levied on all buses which enter the city.

## California Commission Ends Bus Operations Disguised as Taxi Service

Several California operators who sought to legalize their operations over unauthorized routes by designating such operations as taxi service have been ordered by the State Railroad Commission to discontinue the transportation of passengers.

The operators claimed exemption from the provisions of the automobile transportation act requiring all motor carriers to obtain state certificates, on the grounds that their operations constituted rent car or taxi service, which is not included in the act. The commission ruled that the character of service is determined by the facts of operation, and inasmuch as the evidence clearly showed that the operations of the defendants came within the terms of the act, the designation of their transportation activities as taxi service was mere subterfuge.

## New Regulations Announced in Washington State

Hereafter motor stage operators in the state of Washington must post the name of the driver of each car in some conspicuous place in the stage, where passengers can see it, according to a recent ruling of the Department of Public Works. Operators are declared to have suffered lapses of memory when passengers complain of discourtesy on the part of a driver, and the department has frequently been unable to discipline drivers against whom charges have been made. In future, the department will require an identification of drivers when complaints are made, and an investigation will then determine the facts in the case.

At the same time, the department warned stage companies that more care must be exercised to keep within the speed limits; that courtesy and care must be shown in passing vehicles, especially in the face of oncoming traffic, and the welfare of passengers must be painstakingly guarded. The department also ordered that stages must be heated on cold days, and that lights on the stage and inside the compartments for travelers must be looked after.

Finding that some of the companies are careless about using equipment on which licenses have not been obtained, a complete report on collections of fares and equipment used is required of operators.

## Davenport Ordinance Virtually Eliminates Bus Operation

Bus lines have been practically wiped off the streets of Davenport, Iowa, by an ordinance which went into effect Jan. 1, 1923.

The bus lines have been doing a fair business since August, 1920, when they were licensed by the City Council and regulated by ordinance. They have been operating, however, only on lines without grades and their routes paralleled street railway lines. They have been charging a 7-cent fare, while the street cars have been collecting an 8-cent fare. The buses have also been licensed according to capacity by a considerable but not prohibitive fee.

The new ordinance prohibits buses operating on streets where a car line is at present in operation except in cases where bus lines have a downtown terminus and are unable to reach it except by operating over these prohibited streets. The routes are to be established later by the City Council in case there are bus operators who wish to comply with the stringent regulations.

The bus operators are also required to file indemnity bonds, ranging from \$5,000 to \$10,000, according to seating capacity of vehicles. In addition to the bonds the city license is to be from \$15 to \$35 a year, depending on the seating capacity of the bus.

No bus may stop, take on or discharge passengers within any street intersections on streets on which car lines are operated except on the opposite corner to the one on which the street cars regularly stop. The bus lines will also be compelled to maintain regular schedules according to the terms of the ordinance.

At the present time the half dozen buses operating have been running during the rush hours and have been parked during that time of the day when traffic is very light. Most of the passengers who ride in buses have been voluntarily paying 10 cents a ride. This has made possible their continued operation, aided by such special events as the Mississippi Valley Fair and Exposition, which runs for one week each year during which time the bus operators are allowed to collect a 25-cent fare. The city of Des Moines adopted a similar ordinance over a year ago, which practically eliminated bus operations in that city.

## California Certificate Unnecessary for Interstate Lines

The California State Railroad Commission, in dismissing the application of the Interstate Auto Tours Stage Company for a certificate authorizing the establishment of bus service between points in California, Oregon and Washington, ruled that as the applicants did not intend to carry any passengers solely between points in California no certificate of public convenience and necessity was required under the law of the state of California.

**New Safety Regulation in Jersey.**

The New Jersey Public Utility Board has ruled that because of the danger involved, the practice of filling gasoline tanks on buses while the vehicles contain passengers must be discontinued.

**Accidents Cause Regulation of Speed and Schedule in Indiana City.** The owners of buses operating between Elkhart and South Bend, Ind., will be asked shortly by city officials of Mishawaka, Ind., to lengthen their running time. Under present schedules running time between Mishawaka and Elkhart is thirty minutes and between South Bend and Mishawaka twenty minutes. A large number of accidents in which buses have figured during the past few months led the Mayor of Mishawaka recently to ask that the Board of Works recommend much slower schedules and see that speed limits are strictly enforced.

**Operators Petition Springfield Commission for Change in Insurance Laws.**—Intercity motor bus lines operating to and through Springfield, Ohio, have petitioned the City Commission to amend the motor bus ordinance to permit the bus operators to carry liability insurance in mutual insurance companies. Under the present terms of the ordinance, the insurance must be carried with a stock company operating under state license. The petition pointed out that this is unjust discrimination inasmuch as the mutual companies are recognized by the state insurance department and permitted to carry risks in the state.

**State Control Over Interstate Routes Upheld.**—The Washington State Department of Public Works was upheld recently when Judge John M. Wilson in the Superior Court refused to grant an injunction which would prevent the department from interfering with the operation of the Seattle-Portland stage lines by A. D. Schmidt, and dissolved a temporary restraining order which the court had previously issued. Following his arrest for operating a Seattle-Portland stage without a certificate of public convenience from the department, Mr. Schmidt sought to enjoin further interference with his operation, on the ground that the department had no jurisdiction over an interstate line.

**No Jurisdiction Over Irregular Service, Says Illinois Commission.**—In dismissing the complaint of the Village of Elmwood Park, Ill., against George M. Anderson, in which it was alleged that Mr. Anderson was operating a motor bus in violation of the public utility law, the Illinois Commerce Commission held that a motor bus operator starting invariably from a definite point and sometimes following the same route for a considerable distance but going to various destinations according to the wishes of the riders; making trips at irregular times and charging rates of fare entirely in the discretion of the driver, was held not to be operating a public utility business over which the commission had jurisdiction.

# Personal Notes

## Newburgh's Most Famous Son

**B. B. Odell, Jr., Twice Governor of New York, as Head of Railway Decides to Place Buses Over All Existing Rail Lines.**

MANY historical associations cling around the old town of Newburgh-on-Hudson, yet perhaps the proudest day in its history was Jan. 1, 1901, for thousands of people gathered at Albany that day to witness the inauguration as Governor of the Empire



B. B. Odell, Jr.

State of a man born and bred in Newburgh and Orange County.

Since that inauguration day nine other men have taken the Governor's oath at Albany, but Benjamin B. Odell, Jr., is still Newburgh's first citizen. Although the advance of the years has caused Mr. Odell to retire voluntarily from active politics, the former Governor, now more than sixty-nine years of age, retains a vigorous interest in the affairs of his community.

Mr. Odell's business and commercial interests are many and varied. Chief among these is the Orange County Traction Company, of which he has been for years the president. This company controls the electric railway at Newburgh as well as the suburban line to Orange Lake, a very popular summer resort. In the fall of 1922 the company decided to replace the trolleys on its crosstown lines with buses and formed the Newburgh Public Service Corporation to conduct the motorized portion of the company's business.

Benjamin B. Odell has a well-deserved reputation for business sagacity. The bus installation was an experiment, which he and the other railway

men watched closely. Recent a statement from Newburgh into the success of the experiment. After a long study of the local transportation situation and careful comparison between bus and trolley traffic figures, the railway now plans to supplant the trolley on all its lines with motor buses.

B. Bryant Odell, a manager and Fred Berry superintendent of both the Newburgh Public Service Corporation and the Orange County Traction Company. It is expected that after the replacement of the rail line by motor equipment, the Public Service Corporation will absorb the older company.

## Mr. Keenan in New Field

V. E. Keenan, for the past two years assistant research engineer of the Fifth Avenue Coach Company, New York City, assumed charge of the service department of the American Motor Truck Company, Newark, Ohio, on Feb. 1. Mr. Keenan came to the Fifth Avenue Company in March, 1920, when Col. George A. Green, then general manager, instituted the research department of the company. The development of that department to its present high standard of efficiency is largely due to the work of Mr. Keenan, whose duties comprised a thorough analysis of all mechanical devices that would in any way tend to contribute to the economical operation of bus equipment. While Mr. Keenan was at the head of the department comprehensive studies were made on the subject of involuntary stops as well as important researches in the way of fuel, oil and metallurgical analyses.

## Financier and Former Congressman in Bus Industry

No better evidence of the growing prestige of bus transportation can be advanced than the increasing number of men of national prominence, who are becoming associated with the industry. One of the foremost of these is Joseph L. Rhinock, former Member of Congress from Kentucky and for years prominent in public and financial affairs.

Mr. Rhinock is at present a resident of New York City, where he has extensive business interests. His name first became connected with the bus industry as one of the organizers of the United Bus Transit Corporation, which is making extensive plans for city-wide service in St. Louis, Mo. More recently he became associated with E. F. Snimes and William G. McAlister in the proposal for a large bus system in Los Angeles.



## O. D. Street McGraw-Hill Vice-President

Former Western Electric Official Takes  
Charge of Transportation and Elec-  
trical Units of Publishing House.

O. D. STREET, well known for the past ten years as general manager of distribution of the Western Electric Company, has been elected vice-president of the McGraw-Hill Company, in executive charge of BUS TRANSPORTATION, *Electrical World*, *Electrical Merchandising*, *Journal of Electricity and Western Industry*, *Industrial Engineer* and *Electric Railway Journal*. Mr. Street brings to these publications a broad background of business training and a very extensive contact in the electrical industry.

Mr. Street entered the organization of the Western Electric Company in 1901 on his graduation from Williams and has a broad practical training. He



O. D. Street

was in charge of telephone sales on the Pacific Coast, assistant to the president, Atlanta branch manager, general telephone sales manager and latterly general manager of distribution. During the war he rendered invaluable service in reorganizing the warehousing division of the Quartermaster's Corps and establishing an orderly system of forwarding to Pershing's army where chaos had existed before. Under his administration the Western Electric system was expanded by the creation of twenty-two branch houses until Mr. Street was in executive charge of fifty jobbing houses distributing electrical supplies. This responsibility has entailed a personal contact with all sections of the country and all branches of the industry gained in the service of central stations, telephone systems, industrial plants and contractor-dealers, in co-operation with the manufacturers of practically all classes of electrical products. He has become a recognized authority on the broad problem of distribution, now one of the most pressing issues before the industries of America.

Mr. Street was born in Massachusetts in 1877. He is a resident of Bronx-

ville, N. Y. He belongs to the Bankers', University and Williams Clubs and the Siwanoy and Pittsfield Country Clubs.

## Mr. Thorn with Manu- facturer

Transportation Expert With Special  
Experience in Car Design Goes Into  
New Field.

WRAY T. THORN has become connected with the Garford Motor-Truck Company, Lima, Ohio. He was formerly assistant engineer of cars and equipment of the Board of Supervising Engineers, Chicago Traction. It was under the direction of this body that the rehabilitation of the traction lines in Chicago was carried out. With the practical completion of that work some time ago Mr. Thorn became restive. He saw the opportunity passing from him to do any considerable amount of additional creative work in Chicago along the line for which he had especially qualified himself and decided that the field of the automobile offered the greatest possibilities for the future for him.

Some people change from one line of work to another just for the sake of change. They assume that change in itself means progress. The engineer, however, trained to weigh and decide knows better than this, so that when he makes a decision to go from one kind of work to another he is pretty sure to have studied the matter in its remoter aspects. Mr. Thorn did just this thing. The auto as a means of transportation has engaged his attention for a long time, and in BUS TRANSPORTATION last March Mr. Thorn set down with facts and figures what he thought were the possibilities for a class of urban transportation service by auto between the cheap electric railway service and the expensive taxi service, operating on the basis of long non-stop runs, a seated load and rates double or triple those of the car fare.

Few, if any, there are in the United States better qualified than Mr. Thorn to make such a study. Ever since his graduation from Purdue University in 1903 Mr. Thorn has been engaged in transportation engineering. It has been cars and equipment with him almost from the first. From the drafting board he went out into the field as rolling stock inspector of the Chicago street railways, ascertaining and reporting conditions. In all, Mr. Thorn served the Chicago board more than ten years. As engineer in charge of the division of cars and operation he had to do with the preparation of plans and specifications for cars and equipment costing \$7,000,000. He also acted as general consultant in the design of new passenger equipment, his most important work along these lines being for the Kansas City Railways.

It is a broad experience that Mr. Thorn has had in his own field, and the best part of it is that all the while he has been looking beyond the confines of

that field, realizing that a new transportation agency has arisen that is to become a big factor in the future. In appointing Mr. Thorn to its staff the Garford Company not only pays him a personal compliment, but indirectly acknowledges the place of the transportation engineer as a factor in the future development of the bus.

## "Ask Dadd, He Knows"

THE old advertising slogan holds good in the case of James J. Dadd, secretary of the Auto Bus Association of New York State, for Mr. Dadd knows the bus situation in the Empire State as probably no one else does.

In addition to being secretary-treasurer of the state association, Mr. Dadd, is president of the Rochester Bus Lines Advertising Corporation with offices at 120 Vermont Street, Rochester. Mr. Dadd was one of the first men identified with the industry in New York to



J. J. Dadd

visualize the possibilities of bus transportation. He was one of the founders of the state association, which was organized in December, 1921. To use Mr. Dadd's own words, "I conceived the idea that to cement the bus owners of the state together would tend to stabilize the business."

Since the inception of the organization, Mr. Dadd with the president, Alan V. Parker of Niagara Falls, has given unsparingly of his time and energy to the advancement of the industry.

Mr. Dadd has many live, virile ideas on the subject of automotive transportation. At the next meeting of the state association, to be held in Rochester Feb. 15, he will outline a new plan for co-operative insurance. Both in his official and business capacities, Mr. Dadd has done much to further the cause of transport by bus.

John N. Flaherty has been appointed bus supervisor in charge of all buses operated by the Northern Ohio Light & Traction Company, Akron, Ohio. This is a promotion from the ranks of the drivers, as Mr. Flaherty for a long time drove a bus on the West Exchange line.



# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



Market  
affected by  
the  
Production  
of  
the  
Month

## 1922 Sets New Record for Gasoline Consumption

**Production of Crude Oil Increased—  
Gasoline Price Lowered Three Cents  
Since Beginning of 1922.**

WITH a record year in motor production, the consumption of gasoline in the United States reached a new high mark in 1922. The total amount of gasoline consumed in 1922 is estimated at 5,800,000,000 gal., including exports amounting to 600,000,000 gal. Total production and imports amounted to about 6,000,000,000 gal. The average tank wagon price of gasoline in thirty representative cities on Jan. 1, 1922, was 22.8 cents. The average price on Jan. 1, 1923, for the same cities was 19.4 cents.

According to figures collected by the American Petroleum Institute, the im-

than in 1922. There will be plenty of opportunities to make money. I do not expect any great boom, however, although attempts at artificial stimulation may be made. The most optimistic feature of the present outlook is that the process of business readjustment will be carried on and the foundation laid for a period of real prosperity. To the student who understands our present position in the business cycle, this is the most optimistic forecast for 1923 which possibly could be made!"

## Increased Motor Production Forecasted

**Tire Industry Expects Busy Year—  
Further Advance in Tire Prices Predicted—Tire Production Increased.**

THAT the year 1923 will witness a considerable increase in the production of motor vehicles is the prediction heard on all sides. Although there was a slight seasonal decline in December, this decrease in production was not nearly as marked as a year ago. According to the Bureau of the Census, the December, 1922, output of automobiles amounted to 266,418 passenger cars and 20,138 trucks or nearly triple the December, 1921, production. It is significant of the improved conditions that many motor plants, which ordinarily closed down at least for a week in December for inventory, decided that because of the many orders they have booked ahead, any break in their production at this time would be inadvisable.

A good idea of the progressive advance of automobile production may be

gained from the following table compiled by the Department of Commerce:

### Automobile Production by Half Years

Year	1921	1922
Jan. 1 to June 30	1,000,000	1,500,000
July 1 to Dec. 31	1,000,000	1,500,000

The fortunes of the motor industry are reflected in the production and sale of tires. It would therefore follow that the tire industry may look forward to a year marked by greatly increased production. Virtually all the rubber companies, which were not included among those which announced price advances on Jan. 1 or earlier, have since fallen in line. Apropos of the general outlook for the industry, the *Wall Street Journal* recently published an article in which a further advance in tire prices and the stabilization of the industry from a financial standpoint were forecasted. A portion of this article follows:

"The rubber industry, particularly the tire manufacturing division, enters 1923 with every indication that the year will witness the return of real earning power, absent since 1920. Liquidation of high cost inventories has been practically completed, working forces were never more efficient, and more important still the price trend of finished product has started upward. The 10 per cent general advance in tire prices put into effect the beginning of the year is almost certain to be followed by a similar increase before early summer."

In the same issue appears the following tabulation:

	Tire Production	Motor Production	*Motor Production
1923	15,000,000	2,750,000	2,750,000
1922	16,000,000	2,750,000	2,750,000
1921	17,250,000	1,927,000	1,927,000
1920	22,400,000	2,200,000	2,200,000
1919	27,000,000	1,974,000	1,974,000

\*At beginning of year. †Estimated.

### Daily Average Production (Figures in barrels)

	1922 Jan. 20	1922 Jan. 21
Oklahoma	497,850	325,900
Kansas	83,200	83,350
North Texas	57,100	60,900
Central Texas	127,700	214,250
North Louisiana	72,000	91,450
Arkansas	118,000	36,950
Gulf Coast	123,700	107,100
Eastern	111,000	115,500
Wyoming and Montana	103,050	54,500
California	530,000	325,000
*Total	1,736,900	1,418,200

\*Daily average production.

ports of petroleum (crude and refined oils) at the principal United States ports for the week ended Jan. 20 totaled 1,993,157 barrels, a daily average of 284,737 barrels, compared with 1,777,901 barrels, a daily average of 253,985 barrels for the week ended Jan. 13.

Receipts at Atlantic Coast ports were 1,037,839 barrels, a daily average of 148,263 barrels, against 1,346,901 barrels, a daily average of 192,414 barrels, for the week ended Jan. 13.

Receipts at Gulf Coast ports were 955,318 barrels, a daily average of 136,474 barrels, against 431,000 barrels, a daily average of 61,571 barrels, for the week ended Jan. 13.

In the accompanying table are given estimates of daily average gross production of crude oil for the weeks ended Jan. 20, 1923, and Jan. 21, 1922.

## Babson Sees Better Business Conditions Ahead

Roger W. Babson, well-known authority on economic and financial matters, gives the following as his forecast for 1923:

"Business in 1923 should be better

### Gasoline Prices—Jan. 29, 1923

City	Cents Tank Wagon	Per Gal. Service Station
Albany, N. Y.	21	23
Atlanta, Ga.	19	21
Boston, Mass.	22	24
Chicago, Ill.	18	20
Cincinnati, Ohio	19	21
Detroit, Mich.	19 4	21 4
Fort Worth, Tex.	13	16
Indianapolis, Ind.	18 8	20 8
Jacksonville, Fla.	17	19
Kansas City, Mo.	17 5	19 5
Louisville, Ky.	19	21
Memphis, Tenn.	16 5	18 5
Milwaukee, Wis.	18 6	20 6
Mobile, Ala.	16	18
Newark, N. J.	21 5	22 5
New Haven, Conn.	22	24
New Orleans, La.	17	19
New York, N. Y.	22	24
Oklahoma City, Okla.	16	19
Omaha, Neb.	21 25	23 5
Philadelphia, Pa.	21	24
Pittsburgh, Pa.	21	24
Richmond, Va.	21	23
St. Louis, Mo.	18 2	20 5
St. Paul, Minn.	21 5	23 5
Salt Lake City, Utah	20 5	22 5
San Francisco, Cal.	17	20
Seattle, Wash.	19	22
Spokane, Wash.	22 5	25 5
Washington, D. C.	21	23

### Tire News from Akron

THE tire industry is in the midst of production increases which will bring the output of factories in the Akron district to a point never exceeded in the entire history of the industry.

Orders received during the past month have exceeded those received during any first month of any year and every company in the district is adding men rapidly as they can be obtained.

A considerable labor shortage, which will handicap production of tires after the season opens in earnest, is now confidently forecast, together with a general increase in wages and salaries.

This upward movement in labor cost, coupled with the upward movement already completed in crude rubber and the unavoidable advance in the price of automobile tire fabric, brought about by a growing shortage of cotton suitable for tire production, will doubtless bring

about further increases in tire prices before the end of the spring season.

The last tire price increase had to be divided to a great extent with the dealers. Consequently little additional revenue has come to the manufacturers and for this reason a further advance can be confidently predicted although the time at which this advance will take place is problematical.

The rubber tire industry is seriously considering plans for the abolition of the policy of selling tires to bus and automobile manufacturers at almost cost prices.

Announcement by the Kelly-Springfield company that in the future tires sold to manufacturers must be at prices very nearly equaling those of dealers is a forerunner of similar action by other rubber companies in time.

That this policy will be inaugurated this year seems out of the question but it is something which the rubber companies are working forward to. It is impossible to carry this out now because factory capacity is expanded far beyond replacement needs.

## Rolling Stock

**L. D. Blair, Clearspring, Md.** announces the purchase of a new Fageol coach.

**Peerless Stages, operating from Oakland to San Jose, Calif.,** has added another Fageol intercity model safety coach to its fleet.

**Lot Leonard, proprietor De Luxe Stage, Eldorado, Kan.,** is in the market for a bus for his Wichita-Eldorado route.

**Shelton-Olympia (Wash.) Line, operating by Thompson & Dunbar,** has added a sixteen-passenger White bus to its equipment.

**Continental Coach Company, Camden, N. J.,** recently purchased two twenty-two passenger Inter-city model Fageol buses.

**Thomas Lowe, Fort Covington, N. Y.,** plans the purchase of a motor-driven snow plow for use over the Malone-Fort Covington route.

**Northwest Transportation Company, operating from Olympia to Centralia, Wash.,** has placed a Fageol safety coach in operation.

**Washington Township School, Arcadia, Ohio,** recently purchased two buses, increasing the total bus equipment of the township to eight.

**Kenilworth Bus Line, Asheville, N. C.,** has purchased two Mack buses for use on the Asheville-Weaverville route, also two Whites for the Asheville-Charlotte service.

**Range Rapid Transit Company, operating between Duluth and Eveleth, Minn.,** announces the purchase of a Fageol safety coach.

**Greenlaw Brothers, operating between Bogalusa, La., and McComb, Miss.,** recently added a twenty-passenger bus with Tour A Bus body to their equipment.

**Grand Rapids, (Mich.) Railway** has placed an order with the Fifth Avenue Coach Company, New York City, for six buses of the "J" type.

**Jamestown Street Railway, Jamestown, N. Y.,** recently placed in operation three new eighteen-passenger buses, mounted upon Graham Brothers chassis.

**Barrel Way De Luxe Motor Bus Company, Okmulgee, Okla.,** recently purchased a twenty-four passenger White bus of the Tulsa branch of the White Company.

**Greenfield-Indianapolis Line, Indianapolis, Ind.,** through Norman Harvey, manager, has announced the purchase of an eighteen-passenger Ree bus.

**Springfield (Mass.) Street Railway** has purchased a thirty-passenger Selden bus, Model 32, and a twenty-five-passenger White 50 bus for use between Springfield and West Springfield.

**The Sutherland Stages, San Diego, Calif.,** announces the addition of another Fageol safety coach to the fleet which this company operates to Tia Juana, Mexico.

**The Mississippi Transportation Company** operating between Jackson and Vicksburg, Miss., is considering the purchase of additional equipment for proposed extensions of their line to Canton and McComb, Miss.

**Howard Vrooman, Watertown, N. Y.,** recently purchased a twenty-five passenger White bus for his Watertown-Sacketts Harbor line and another bus of the same type for the Watertown-Cape Vincent route. The sale was made by De Friend Motors, agents for the White Company in the Watertown section.

**Columbus, Newark & Zanesville Street Railway** has put into use on Ridge Avenue, Zanesville, a seventeen-passenger bus mounted on a Graham Brothers chassis and purchased through the Gorrel Motor Company.

**Newberry County Bus Line, Inc., Newberry, S. C.,** recently purchased a fourteen-passenger bus, with a Conover body mounted upon a White chassis. According to Hal Kohn, president of the company, two additional White buses will later be put into service.

**South Bend Motor Bus Company, South Bend, Ind.,** has placed an order with the Overland-South Bend Company, Inc., for four Indiana truck chassis, Model No. 25, equipped with Indiana twenty-five-passenger bus bodies. Delivery will be made March 1.

**White Coach Transit Company, F. S. Supri, proprietor,** announces the purchase of two twenty-five-passenger White buses. The sale was made through the White Truck Sales Company, Canton, Ohio, and the buses will be used on the newly established Youngstown-Canton route.

**Pocahontas Transportation Company, Welch, W. Va.,** is in the market for five sixteen to eighteen-passenger buses. This company requires buses with short wheelbase, built low and as narrow as possible to conform to the requirements of mountain roads. Carroll R. Woods is president and manager of the concern.

## Business Notes

**Johnson Fare Box Company, Chicago, Ill.,** has opened an Eastern sales office and service station at 366 Madison Avenue, New York City.

**Sanford Motor Truck Company, Syracuse, N. Y.,** announces the appointment of E. A. Bauer as New England sales manager with headquarters at Boston.

**Tire & Rim Association of America, Inc.,** announces the new location of its Cleveland (Ohio) offices at 1401-1402 Cleveland Discount Building, Superior Avenue and East Ninth Street.

**Francis W. Davis, formerly truck engineer for the Pierce-Arrow Motor Car Company, Buffalo, N. Y.,** has opened offices as a consulting engineer in the Metz Building, Waltham, Mass.

**Air Reduction Sales Company,** whose executive offices were formerly maintained at 129 Broadway and 160 Fifth Avenue, have consolidated these offices at their new location, 342 Madison Avenue, New York City.

**A. J. Sanderson, better known as "Jack,"** has resigned as general sales manager of the Maccar Company, Scranton, Pa., to become vice-president of the Mueller Engineering Company, manufacturer of automotive units, with offices in Scranton.

**American Chemical Paint Company,** with main offices in Philadelphia, Pa., has commenced manufacturing its products in the new Canadian factory at 425 Pierre Avenue, Windsor, Ont., from which the export and Canadian trade will be supplied.

**C. M. McCreery, intimately connected with the development of the bus tire of the Goodyear Tire & Rubber Company and the transport department of that concern,** has gone to Europe to study bus and truck developments.

**General Motors Corporation** has acquired all the outstanding stock of the Brown-Lipe-Chapin Company, manufacturers of gears and differentials with plants at Syracuse, N. Y., H. W. Chapin, general manager of the concern since its inception, becomes president, succeeding A. T. Brown.

**United Globe Rubber Company, operating a large plant in Trenton, N. J.,** has been absorbed by the United Globe Rubber Corporation, recently incorporated in Delaware. The new company has acquired all the assets, patent rights, trade marks and business of the old company, which passes out of existence.

**Cornelius T. Myers, consulting automotive engineer, Rahway, N. J.,** announces that he has resigned as a member of the advisory council of the Federated Engineers Development Corporation of Jersey City, and that he now has no connection whatsoever with that concern.

**F. W. Gargett, formerly with the Transport Truck Company in the capacity of factory manager,** has accepted a position with the Indiana Truck Corporation, Marion, Ind., as assistant to the president. In this capacity Mr. Gargett will look after the branches and subsidiaries of the company.

**The Vig-Tor Axle Company, Cleveland, Ohio,** has purchased the plant of the Forest City Machine & Forge Company at 5101 Lakeside Avenue, N. E., in that city. Viggo V. Torbensen, president of the Vig-Tor Company, has announced that operations at the newly acquired plant will begin at once.

**The Barr Rubber Products Company, Lorain, Ohio,** heretofore a closed corporation, will increase its capital stock from \$25,000 to \$100,000 and will move from Lorain to Sandusky, Ohio, where it will occupy the former plant of the Kroma Color Company on East Market Street. The president of the company is N. T. Barr.

**Horace L. Howell, formerly with the National Railway Appliance Company, New York,** as manager of research and information in behalf of the London Underground Group and the London General Omnibus Company, is now sales manager and engineer with the Johnson Fare Box Company, Chicago.

**Ackerman-Blaesser-Fezzey, Inc., 1258 Holden Avenue, Detroit, Mich.,** has been organized to manufacture a mechanical window regulator. The company is headed by E. L. Ackerman, president. His associates are C. E. Blaesser, secretary-treasurer, and Chet Fezzey, sales manager. Alois Zwierzina has been appointed superintendent in charge of manufacturing and production.

**The Ohmer Fare Register Company, Dayton, Ohio,** has acquired the fare register and fare box business of the Dayton Fare Recorder Company and the Recording and Computing Machines Company of the same city. Included with this transfer is the business of the Sterling-Meaker Register Company and the New Haven Register Company, which was previously acquired by the Dayton Fare Recorder Company.

**Motor Truck Industries, Inc.,** is the new name of the organization formerly known as the National Association Motor Truck Industries. The organization, membership and officers are the same as heretofore and the headquarters are still at 1156-57 Book Building, Detroit, Mich.

**Brown Body Corporation, Cleveland, Ohio,** announces the opening of the new plant No. 2 at Forty-ninth Street and Superior Avenue. This is a much larger plant than the original No. 2, which was recently destroyed by fire, and the company expects with the new arrangement to double its capacity.

## Advertising Literature

**Schick-Wheeler Company, Milwaukee, Wis.,** has issued a bulletin describing the S&W "Limited" motor coach. This coach consists of a Packard twin-six rebuilt chassis, and a body of fifteen to eighteen passenger capacity.

**FitzJohn-Erwin Manufacturing Company, Muskegon, Mich.,** has issued for distribution among Ree dealers, a portfolio, containing illustrations and specifications of three models of standard Fitz-Er motor bodies for mounting on Ree speed wagon chassis.

**Continental Axle Company, Edgerton, Wis.,** has issued a reprint of C. B. Orr's article entitled "Small Diameter Pneumatic Tires," which appeared in the November issue of BUS TRANSPORTATION. The reprint also contains details of the Continental coach front axle.

**The White Company, Cleveland, Ohio,** has issued a twenty-four-page booklet giving a wealth of information on the use of motor buses. Profusely illustrated, the booklet shows a wide variety of designs suitable for many different fields of bus operation. According to information contained in the booklet, more than 3,200 White buses are now in service. Information is also given on the operation of buses in city service as traction line feeders, intercity lines, for de luxe tours, for schools and institutions, and for park and sightseeing.



# BUS TRANSPORTATION



New York, March, 1923

## Zone Fare System Used Successfully on Line Serving Rochester's Fifth Avenue



*All aboard for Corbett's Glenn, Maplewood Inn Park and other points en route to Pittsford, N. Y.*

**D**OWNTOWN in Rochester, N. Y., East Avenue is a high-class shopping and business street. Further out are several blocks devoted to Automobile Row, and then East Avenue continues on to the city limits as one of the best residential sections of the "Kodak" city. Beyond the city line East Avenue passes through the adjoining suburb of Brighton, and to the town of Pittsford, a rapidly growing suburb of Rochester.

All this by way of describing the route covered by the East Avenue Bus Company, Inc. Over the 7-mile stretch, from Main Street and East Avenue, Rochester, to the center of Pittsford, four thirty-passenger buses, with Selden chassis and Kuhlman steel bodies, have been operated since last June. In keeping with the character of the territory covered, these vehicles are of the deluxe type, well kept up and finished, and driven by drivers in uniform.

During the summer the first bus

### Modern Buses Give Frequent Service to Outlying Suburbs — Business Houses and Hotels Help to Develop Bus Habit

left Pittsford at 6 o'clock in the morning, and Rochester at 11:30 in the evening, but under a new schedule started on Sept. 20, this bus leaves at 6:45 a.m. and the last one from Rochester at 11:45 p.m. The schedule calls for hourly service during the greater part of the day, with buses on the half hour during morning and evening rush. Thus nineteen round trips are made on each weekday; on Sunday the schedule is cut down slightly, and only thirteen round trips are made.

There are only four zones, the first from the Rochester terminal to Culver Road, on the outskirts of the city,

taking a 10-cent fare. Beyond that there are three 5-cent zones, Culver Road to Clover Street, Clover Street to Maplewood, and Maplewood to Pittsford. The total one-strip fare, Rochester to Pittsford, is therefore 25 cents. These fares are on the cash basis, of course. Two special forms of tickets are used, the first of the strip type, containing twenty tickets in 5-cent units, and selling for 90 cents. Then there is a monthly commutation ticket, good only for the trip between Pittsford and Rochester. This is good for fifty trips, and is sold for \$7.50. The 25-cent rate is thus brought down to 15 cents by the use of the commutation.

Fare collection is on the pay-leave plan. Each passenger on entering is given a colored receipt, different colors being used for each zone. These are numbered, in addition to being of the different colors. When the passenger leaves he delivers up this receipt so that the driver knows just how much fare should be col-



forms show how the receipts are recorded. The trip record, which is filled out in the office on the basis of the daily bus reports and the tickets turned in, is practically a record of all receipts, except commutation tickets. The daily earnings report form, which sums up the work done by all buses during the day, also contains spaces for recording the outstanding tickets or ticket liability, total passenger revenue, and chartered car revenue.

#### EAST AVENUE EQUIPMENT

Four buses are in service, the schedule requiring three as a maximum so that one is always kept in reserve. These buses are mounted on Selden unit 52 chassis and carry twenty-nine passenger bodies built by the Kuhlman Company, Cleveland. The chassis is of the low-hung type, which brings down the floor to within 30 in. of the ground. The frame is kicked up over the rear axle for this purpose. Three of the buses are fitted with Sewell cushion wheels. The front tires are 36 x 4 single, and the rear 35 x 4 dual, both Goodrich semi-pneumatics. The fourth bus was fitted with steel disk wheels and pneumatic tires, 36 x 6 front and 36 x 6 dual rear, but these have been replaced by Firestone solids. The pneumatics were tried on account of the bad road conditions outside the city which resulted in uncomfortable riding over the greater part of the route. It was found, however, that on the right-hand front wheels they wore out quickly because of the rough unpaved shoulders of the highway. The route covered by the buses is to be repaved, however, and it is thought that when the improvements are completed the cushion tire equipment will prove satisfactory.

The chassis components include a Continental engine, 4½ in. bore and 5½ in. stroke, giving 48 b.hp. at 1,400 r.p.m. Ignition is by Eisemann magneto. The carburetor is Stromberg, 1½ in. size. The clutch is of the multiple-disk type and is fitted with a clutch brake. Transmission is mounted amidship and is of the four-speed type. Final drive is through underslung worm on the semi-floating type rear axle.

Fuel is carried in a 35-gal. tank, mounted in a compartment at the left of the driver. The battery is placed under the driver's seat in a 21 x 12½ x 12 in. space. Ample illumination is provided by a 25-amp. generator.

## Closed System of Intercity Fare Collection

Comparison of Methods Used by  
Connecticut and Ohio Lines—Forms  
of Punched Tickets Are Illustrated



*MacDonal ticket holder. Weighs 7 oz. with pad*

THE systems of fare collection used by the Connecticut Motor Transportation Company, New London, Conn., and the Cleveland-Youngstown Bus Company, Cleveland, Ohio, offer an interesting contrast. The tickets for the two lines are shown here, and it will be noticed that while both are of about the same size, the arrangement is strikingly different.

Both of them make use, however, of the closed system of fare collection and of the system of cash receipts put out by the MacDonal Manufacturing Company, Cleveland, Ohio. In this system the tickets are printed in pads of 100 to fit a holder containing pointers that mark the tickets when they are torn from the stub.

Fare collection on the Connecticut line, which operates over a new 45-mile concrete highway between Hartford and New London, is about as follows:

A few minutes before the time scheduled for the bus to leave the terminal, the driver starts at the rear and inquires the destination of each passenger. The driver then collects the amount of the fare, and sets the pointers of the ticket (on which the date and hour have already been punched) in four places as follows: Station where passenger starts, station where he says he will

leave, fare between the two points, and the item cash. As the final step the ticket is separated from the stub and given the passenger, the stub being retained by the operator.

Passengers picked up at intermediate points along the line pay their fares and receive their tickets as they enter, and before the bus starts.

The Connecticut ticket, which is reproduced here, shows that on Nov. 10 No. 0004 was issued by operator "B" of Car No. 8, between 5 and 8 a.m., to a passenger picked up at Glastonbury, discharged at Salem, and that \$1.25 cash was received.

Throughout the trip the driver announces each station or zone, which on the Connecticut line takes a fare of 25 cents, with 25 cents for each lap-over. When the passenger leaves the bus, the ticket is collected by the driver. If a passenger presents a ticket which indicates he has passed the destination punched, the driver knows that he has tried to "beat" his passage part way, and he is made to pay the balance of the fare.

At the end of each round trip all tickets and fares received are turned in. Stubs are turned in at the end of the day's operations and must check with the tickets issued and money received.

To understand how the system



CASH	PASS-EMPLOYEE	PASS-LEVEL
SPECIAL TRIP	SPECIAL TRIP	SPECIAL TRIP
FARE PAID	FARE PAID	FARE PAID
.25	.25	.25
.50	.50	.50
.75	.75	.75
1.00	1.00	1.00
1.25	1.25	1.25
1.50	1.50	1.50
1.75	1.75	1.75
2.00	2.00	2.00
HARTFORD	HARTFORD	HARTFORD
EAST HART.	EAST HART.	EAST HART.
GLASTONBY	GLASTONBY	GLASTONBY
CARLINIS	CARLINIS	CARLINIS
BUCKS COR.	BUCKS COR.	BUCKS COR.
D'R HOLLOW	D'R HOLLOW	D'R HOLLOW
MARLBORO	MARLBORO	MARLBORO
FAWN BROOK	FAWN BROOK	FAWN BROOK
COLCHESTER	COLCHESTER	COLCHESTER
WESTCHESTER	WESTCHESTER	WESTCHESTER
HILLSIDE	HILLSIDE	HILLSIDE
SALEM	SALEM	SALEM
WILLOWS	WILLOWS	WILLOWS
HORSE POND	HORSE POND	HORSE POND
CHESTERFIELD	CHESTERFIELD	CHESTERFIELD
LAKES POND	LAKES POND	LAKES POND
CHAPELLE	CHAPELLE	CHAPELLE
NEW LONDON	NEW LONDON	NEW LONDON

Car No. 8

*Ticket form used on Connecticut line, punched for month, day, hour, fare and terminal points.*

works, reference should be made to the holder which is illustrated here. This takes a ticket 5 in. long, although sizes taking 6 and 7-in. tickets are also available. The holder, which is made of German silver and heavy sheet aluminum, has two purposes: to hold the pad and to mark the individual tickets. Its interior, which is hollow, contains small posts which pass through holes punched along the inside edge of the ticket pad. On the outside are carried movable pointers which can be set at the place desired, along the ticket. The result is a permanent record on

the ticket when it is torn off, and also on the stub portion in the holder.

On the back of each holder is a numbering device or register which indicates the number of times the holder has been opened. When the driver receives the holder it is loaded with a pad of 100 tickets and a record made of the pad number and register reading. This reading must correspond to the reading made when the holder is returned for a new pad, as drivers are not permitted to open the holder, or for that matter to check up on the amount of money they owe the company. Instead they are required to return all cash in their possession over and above their "bank" or change.

A still more simple form of ticket is that used on the Cleveland-Youngstown bus line, a sample of which is illustrated. It will be noticed that only three settings are required to mark a ticket. As a rule, however, most of the work will be done with one pointer. For example, the pointers will probably be set at cash and Cleveland, and all the fares collected by setting the third pointer on the destination, which would also represent the fare amount. In the other ticket shown here, the amount of the fare is definitely indicated, but it is said that this is unnecessary; it is a simple matter for passengers to figure their own fare from the ticket, and a new driver can carry a schedule of rates so that he will neither overcharge nor undercharge the passenger. The Cleveland form is said to be the fastest ticket ever put out, and is recommended for one-man bus lines.

The use of this system results in valuable data. In addition to being

PASS	PASS
TICKET	TICKET
HALF FARE	HALF FARE
CASH	CASH
OVERRIDE	OVERRIDE
Cleveland	Cleveland
City Limits	City Limits
Randall	Randall
Solon	Solon
Geauga Lake	Geauga Lake
Aurora Sta.	Aurora Sta.
Mantua Cent.	Mantua Cent.
Mantua	Mantua
Shaylersville	Shaylersville
Ravenna	Ravenna
Campbellsport	Campbellsport
Edinburg	Edinburg
Palmyra	Palmyra
Lake Milton	Lake Milton
Jackson	Jackson
Austintown	Austintown
Wickliffe	Wickliffe
Youngstown	Youngstown

Good for one continuous trip between stations selected for this day and car only. Retain this receipt as evidence of fare paid as it must be returned to conductor who issuing car.

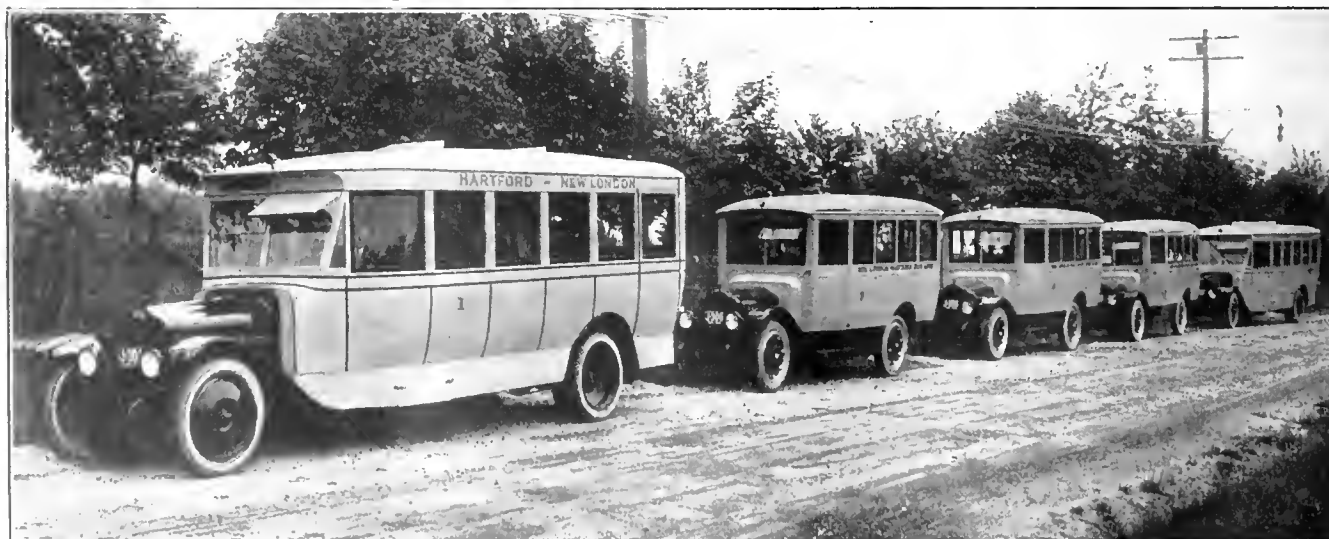
**CLEVELAND-YOUNGSTOWN BUS CO.**  
F. G. GRIEGER, President

*Ticket form used by Cleveland-Youngstown line. Fare and destination shown by same pointer.*

a check on the driver, the system gives the number of passengers carried per day, per trip, per bus, the through traffic or that between certain zones, the earnings for any one bus, and the cash collected per bus.

## Magnitude of Oregon Bus Operations

ACCORDING to a report prepared by the Oregon Public Service Commission, automobile stage and truck lines in Oregon now cover more mileage than all the railroads combined. At present, practically every highway in the state is traveled by regularly scheduled passenger and freight lines, and it is now possible to purchase a ticket in British Columbia for a through stage trip to the Mexican border.



*Fleet of White buses used on Hartford-New London Bus Line*



## How a Northwestern Line Collects Fares

THE Ortonville Transportation Company, whose routes extend into three Northwestern states, has something different in the line of fare collection. Facsimiles of the

R. E. Billings is the president of this concern, which operates a line in Ortonville as well as three lines radiating from that city to Sioux Falls, S. D.; Milbank, S. D., and Wahpeton, N. D. In the spring an ex-

tension of the Milbank route to Watertown is planned. The routes have been kept open this winter only under heavy difficulties because of blockades experienced as a result of heavy snowfalls.

## Improving Interurban Service with Dual Tires on Buses of the Stage Type

THE run of 125 miles from Los Angeles to Bakerfield over the Motor Transit Company's system follows the Ridge Route, which for 50 miles winds and twists continually around sharp curves on a 10 per cent grade. This road, regarded as one of the outstanding Western accomplishments in highway construction, follows the backbone of the Castaic mountains; it rises to a height of a mile above sea level, includes 1,100 turns within a distance of 29 miles and affords an ever-changing panorama with a wide variety of colorings. Stages making

this run have until recently been equipped with single tires on each wheel. By substituting dual tires on the rear the tire cost has been materially reduced and the safety and comfort of the service has been increased.

With the single 36 x 6-in. tires originally used a very decided swaying of the stage body was caused by the reversal from one sharp curve into another. The substitution of dual 34 x 5-in. tires not only gave a lower center of gravity, but by lessening the height and increasing the width of the flexible base of

### Round Trip Ticket

Ortonville - Milbank  
AND RETURN

Price \$1.25

The coupon form of ticket is used on the Ortonville-Milbank route for round trip rates.

tickets in use over two of the lines of this company are shown on this page and illustrate the methods employed. On the third route, the Ortonville, Minn.-Milbank, S. D., line, an oblong pasteboard ticket of the railroad type is used.

REVERSE SIDE FOR RATES. RETURN TICKET TO DRIVER UPON LEAVING BUS														
PUNCH BOTH STATIONS AND AMOUNT. GIVE TICKET TO PASSENGER.														
	Ortonville	Odessa	Bellingham	Madison	Canby	Ivanhoe	Lake Benton	Pipestone	Trosky	Luverne	Beaver Creek	Manley	Valley Springs	Brandon
Ortonville		.50	1.10	1.85	3.10	4.10	4.90	5.90	6.40	7.40	7.90	8.15	8.25	8.60
Odessa	.50		.60	1.35	2.60	3.60	4.40	5.40	5.90	6.90	7.40	7.65	7.75	8.10
Bellingham	1.10	.60		.75	2.00	3.00	3.80	4.80	5.30	6.30	6.80	7.05	7.15	7.50
Madison	1.85	1.35	.75		1.25	2.25	3.05	4.05	4.55	5.55	6.05	6.30	6.40	6.75
Canby	3.10	2.60	2.00	1.25		1.00	1.80	2.80	3.30	4.30	4.80	5.05	5.15	5.50
Ivanhoe	4.10	3.60	3.00	2.25	1.00		.80	1.80	2.30	3.30	3.80	4.05	4.15	4.50
Lake Benton	4.90	4.40	3.80	3.05	1.80	.80		1.00	1.50	2.50	3.00	3.25	3.35	3.70
Pipestone	5.90	5.40	4.80	4.05	2.80	1.80	1.00		.50	1.50	2.00	2.25	2.35	2.70
Trosky	6.40	5.90	5.30	4.55	3.30	2.30	1.50	.50		1.00	1.50	1.75	1.85	2.20
Luverne	7.40	6.90	6.30	5.55	4.30	3.30	2.50	1.50	1.00		.50	.75	.85	1.20
Beaver Creek	7.90	7.40	6.80	6.05	4.80	3.80	3.00	2.00	1.50	.50		.25	.35	.70
Manley	8.15	7.65	7.05	6.30	5.05	4.05	3.25	2.25	1.75	.75	.25		.10	.45
Valley Springs	8.25	7.75	7.15	6.40	5.15	4.15	3.35	2.35	1.85	.85	.35	.10		.35
Brandon	8.60	8.10	7.50	6.75	5.50	4.50	3.70	2.70	2.20	1.20	.70	.45	.35	
Sioux Falls	9.05	8.55	7.95	7.20	5.95	4.95	4.15	3.15	2.65	1.65	.15	.60	.80	.45

RETURN TICKET TO DRIVER UPON LEAVING BUS											
Punch Both Stations and Amount. Give Ticket To Passenger											
	Ortonville	Clinton	Graceville	Collis	Dumont	Wheaton	White Rock	Farmington	Breckenridge	Wahpeton	
Ortonville		.50	1.00	1.25	1.50	2.00	2.50	3.00	3.75	4.25	
Clinton	.50		.75	1.00	1.50	2.00	2.50	3.25	3.75	4.25	
Graceville	1.00	.50		.25	.50	1.00	1.50	2.00	2.75	3.25	
Collis	1.25	.75	.25		.25	.75	1.25	1.75	2.50	3.00	
Dumont	1.50	1.00	.50	.25		.50	1.00	1.50	2.25	2.75	
Wheaton	2.00	1.50	1.00	.75	.50		.50	1.00	1.75	2.25	
White Rock	2.50	2.00	1.50	1.25	1.00	.50		.50	1.25	1.75	
Farmington	3.00	2.50	2.00	1.75	1.50	1.00	.50		.75	1.25	
Breckenridge	3.75	3.25	2.75	2.50	2.25	1.75	1.25	.75		1.00	
Wahpeton	4.25	3.75	3.25	3.00	2.75	2.25	1.75	1.25	.75		

431

### RATES OFFERED ONLY ON THROUGH TRIP AND FROM AND TO

Ortonville to Sioux Falls  
Ortonville to Pipestone  
Ortonville to Luverne  
Pipestone to Sioux Falls

1.00  
5.00  
6.00  
2.00

Regular rates will be charged from and to all other stations. Passengers picked up on highway will be charged from nearest station to destination.

We will not be responsible in case of delay or failure to make train connections, but will hold to schedule at all times if possible.

165

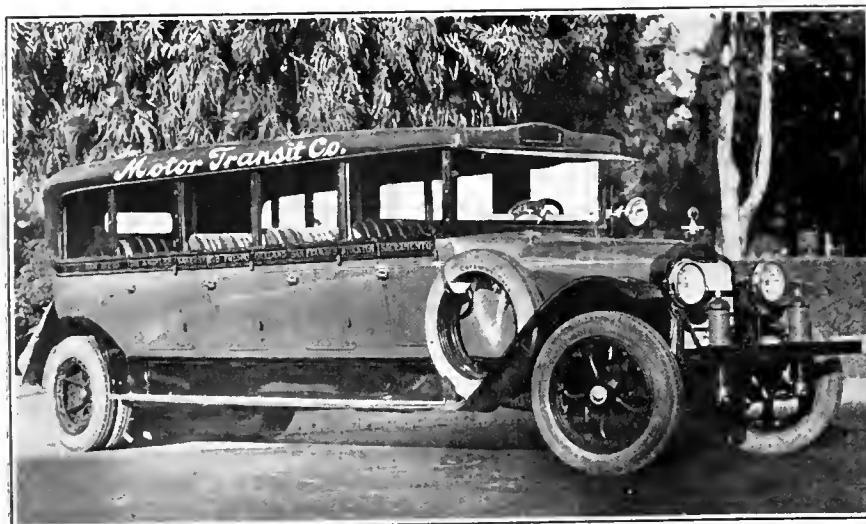
### Rates Offered only on Through Trip and From and To

Ortonville to Wahpeton

Regular rate will be charged from and to all stations. Passenger picked up on highway will be charged from nearest station to destination.

We will not be responsible in case of delay or failure to make train connections, but will hold to schedule at all times if possible.

A tariff card is the basis for form of ticket used. The driver punches the boarding station and the amount of fare paid. On the reverse side, as shown at the bottom, the tickets are punched with the through rates shown for continuous trips. At Left—Ticket used on Ortonville-Sioux Falls Line. At Right—Ticket used on Ortonville-Wahpeton Line.



*Type of stage using dual tires on steel rear wheels*

which the car swayed, the swaying effect so objectionable to some passengers was practically eliminated. There is also a decided advantage in the resistance to skidding for which dual tires are noted. This is an economy as well as a safety feature, because to this elimination of the tendency to slip sidewise is ascribed a much greater tire mileage than would otherwise be obtained on this route, which is paved with unsurfaced concrete. In a comparative test, the single 36 x 6-in. tires, listing at \$82.75 each, gave 4,500 miles as against 9,500 miles for 34 x 5-in. tires listing at \$53.50 each, a differential of 1.44 cents per bus-mile in favor of the dual tires.

This test was made in warm weather and is believed to represent a somewhat lower mileage than the average for the year. Exact mileage records cannot be compiled because tires are not kept on stages on the Ridge Route until they are worn out. As soon as the treads are worn smooth the tires are transferred to stages operating on valley runs. This is done to insure the maximum of safety on the heavy grades and sharp curves of the Ridge Route. Previous discussion of tire mileages on mountain and valley routes of this company appeared in *BUS TRANSPORTATION* for November, 1922, page 595.

The use of dual tires on these stages is made possible by the special extension wheels developed by the Motor Transit Company and described in *BUS TRANSPORTATION* for March, 1922, page 172. The only change in the design of that wheel made to adapt it to stages

that operate on the Ridge Route was to decrease by 1 in. the width of the spacer strip between the two rims. The narrower width, which is ample for the smaller sized tires, was desirable because it decreases the width

of tread and to this extent decreases overrun on pavement shoulders.

Although the advantages of dual tires for service on cars of the street car type, which this company uses in local service, has long been appreciated, it was not until the company had developed the steel wheel referred to above that it was thought feasible to use dual tires in a service where the stage would operate so far from the repair base. Then, too, the stage used for long distance service is a development of the touring car, while the local service bus (street car type) is a development from the truck. Hence the logical process of evolution was for stages to operate with single tires in the rear, merely increasing the tire size as the car was lengthened to carry more passengers. The steel wheels for dual tires are not in danger of getting out of shape, and if the inside tire goes flat it can be changed in about ten minutes, as against an hour or more for old wooden wheel duals.

## Detroit Independent Operators Have Paying Organization Plan

**P**RACTICALLY all the individual bus owners in the city of Detroit are organized into one association, the Red Star Motor Drivers' Association. This was organized under Michigan laws about a year ago and is the sole survivor of a number of similar organizations. It regulates and supervises virtually all independent motor passenger transportation in the city, excepting, of course, the Detroit Motor Bus Company.

Members own their own cars and pay all maintenance costs. A monthly association fee of \$12 is also levied. Funds collected in this way are devoted to the payment of \$1,000 public liability insurance, \$1,000 property damage insurance, miscellaneous legal assistance and association maintenance.

It is estimated that a driver carrying 100 passengers daily and covering 100 miles earns a total of about \$12 per day. His expenses are: Association fee, 43 cents; gasoline, \$1.60; oils, 25 cents; depreciation and repairs, 65 cents; total expenses, \$3.93; leaving a net profit of about \$8 per day.

The buses of the association, which are nearly all of the touring car type, are operated over four leading thoroughfares of the city. The fares

are: Within the 4-mile circle, 10 cents; outside the 4-mile limit, 15 cents. Twenty cents is charged for service between the hours of 1 a.m. and 5 a.m.

The approximate number of vehicles in operation in the city is given as 550 and the daily passenger total is said to average 35,000 people, increasing to from 45,000 to 50,000 on Saturdays.

A large majority of these buses operate between the City Hall and the Ford motor plant, where at the termination of each eight-hour shift, about 20,000 employees are released. About two hundred of the motor cars which meet these shifts aid greatly in supplementing the street railway service and reducing street congestion. Passengers save from ten to fifteen minutes by using the buses, which make the trip of 5½ miles from City Hall to the Ford plant in twenty minutes while the street cars require thirty-five minutes.

Since the inception of the business two years ago, the number of operators has declined considerably. At one time 968 machines were in operation. This decrease is attributed largely to legal efforts on the part of the city to eliminate this kind of service.

# Individual and Company Applications of the Motor Bus

The Writer Sets Forth the Conditions Which Call for Motor Bus Operation Either by Independent Individuals or by the Old Established Transport Organizations

*By Walter Jackson*

Fare and Bus Consultant, Mount Vernon, N. Y.

**A**FTER half a dozen years of blind opposition, our steam and electric railways have come to realize that the motor truck and the motor bus really belong. Wise steam operators are no longer worried because the motor truck will take the short-haul less-than-carload lot shipments off their hands, while forward-looking electric railways are making motor bus operation an integral part of their business. So we have now come to that stage where we can discuss the matter of "rail or tire" dispassionately. This article will touch, however, only on the passenger aspect as related to city and country bus or coach.

## FOR LIGHT COUNTRY SERVICE INDIVIDUAL OPERATION IS BEST

The fact that a single vehicle costing but a few hundred dollars is power station, distribution system and rolling stock all in one, while the roadway is supplied by the state and the repair shops and fuel stations by concerns founded to serve owners of private cars makes the one-man public utility a perfectly natural development. Indeed, the one-bus operator of today is in the same delightful position as the journeyman of the Middle Ages: He and his tools for living travel together. Like the journeyman, also, if the picking is not good in one place he hies himself to another. Of course, this nomadism cannot be permitted to one who seeks even the humblest transportation monopoly. That is why more and more state legislation insists upon dependability.

Assuming that the operator does propose to give the regular service required by his permit, the question arises: Will an individual or a company give the public more value for its money?

Generally speaking, individual operation will give the better value if

the business is so small that the owner himself is a driver and direct supervisor of service, and if the number of buses operated are so few that the drivers are close friends of the owner and not restricted by labor legislation as to hours, accident insurance and the like. The reason is simple: A transportation outfit of this kind is not troubled by eight, nine or ten-hour laws, so one or two shifts can serve in place of two or three. Wages per diem are also lower because no one expects the men to wear uniforms. So, too, inspection and upkeep costs are less because the community does not expect as high a standard of comfort and reliability as it would demand from a corporation. Finally, the fact that the vehicles are run by the owner, his brother, his first cousin or his particular chum leads to a degree of helpfulness toward the passenger that can hardly be duplicated by impersonal company operation.

Since there are thousands of villages and hamlets to hundreds of towns and cities, we may rest assured that there will always be an enormous field for the individualist in bus transportation. It behooves our legislators not to confuse this useful field of creative work with that of depredations into territory already served by rails. Such a distinction is necessary to save the country operator from being asked to supply reports according to a standard accounting system intended for large concerns; or from furnishing liability bonds commensurate with those demanded for running in crowded cities.

## CO-OPERATION WITH MERCHANTS AND RAILWAYS

Although operating alone, there is no reason why the individual operator should not join hands with his fellows or with the local railways

when opportunity arises. The greatest weakness of the individual operator is that he is not likely to have reserve equipment of the same capacity, although one can always borrow a touring car or limousine. Where five or six operators are feeding into the same market or traffic center, they ought to find no trouble in working out a plan for purchase of one or two buses. The capital cost could be shared among themselves and the use of this spare equipment charged for at an agreed figure per mile.

It is not customary for merchants' associations in general to work co-operatively with many electric railways nowadays. At the moment, however, they are as glad to have buses come in from the country towns as they were to see the trolley aforesaid. So it has come about that quite a number of such bodies have gone to the expense of building terminal stations and waiting rooms for busmen at practically nominal rentals. This is a great help to the bus operator, not only in saving overhead expense but also in attracting traffic that he would not get otherwise. Those who have done much traveling on buses know how much easier it is to get started if one has a well-known bus station with information booth to go to than to be told that "the Hicksville bus is supposed to come in at 3 o'clock or maybe 1 o'clock at the corner of Smith Street and Main or maybe Smith Street and Wilkins, I ain't sure."

How long merchants will continue to subsidize bus operators is questionable. It is one thing to do this before a rival town wakes up and another thing to continue it after everybody else is doing it. After all, the building of a terminal station is a strictly transportation affair. For this reason, the action of Stone & Webster, who control the electric

railways at Bellingham, Wash., is one that sets an example for permanent following. Here, in the summer of 1922, the Puget Sound Power & Light Company built a station for the buses that center in Bellingham from various directions. Unlike the merchants or realtors, the company had no axe to grind as to location, and therefore could pick out a spot which would not be expensive or too far away from the logical business center. The significance of this policy is that an organization which had done great things itself with the bus in the very same state should recognize that in instances of this kind it is better to help the individual operator than to attempt to supplant him.

#### WHERE COMPANY OPERATION IS NECESSARY

The next step in motor bus transportation relates to communities connected by a trunk highway which are of sufficient size to call for more and better equipment than can be handled by the individual operator. Here, again, Stone & Webster furnish an example of leadership. Not so long ago the highway territory between Seattle and Everett and further north between Everett and Mount Vernon was served by a variety of vehicles in the hands of individual owners. These vehicles and attendant operating permits were acquired at a reasonable purchase price because competition and wear of equipment had made the business unprofitable. Under the new ownership, fewer vehicles are giving far better service because they are run on a definite time card and not haphazard. The vehicles themselves—limousine motor coaches—are such an improvement in fitments and reliability over their predecessors that traffic has improved enormously. The drivers are now uniformed and the men are of such high grade that the rider involuntarily feels he is riding in a personal car with a private chauffeur.

It is true that while the Seattle-Everett rights, at least, were originally purchased to protect the interurban railway, the final result has shown the superiority of scientific to haphazard means of transportation when there is sufficient business for company standards of service.

In the Seattle-Everett case, the motor coach supplements interurban service over practically parallel routes through alternation in time, viz., the cars leave on the hour and

the coaches on the half hour. In the case of the Citizens Traction Company, operating between Oil City and Franklin, Pa., a bus route was inaugurated to provide a detour from a river route. In other instances, railways have started alternative routes because their cross-country trolleys become the roundabout routes after the construction of new paved highways.

In these examples, the motor bus was not primarily installed to make money but to protect existing investments. It is but fair that the railways should have the first choice of making use of any advances in the art of transportation. If they have waited for a jitney operator to show them the way, it has been due often enough to a natural hesitation to add to an already excessive investment.

It is not pleasant for investors in a small town railway to be told that all or part of it must be taken up and replaced by motor buses. Yet this is something that many such railways are facing today. So far as the writer can judge, the chief reason for this lies in the immediate-service habit which the private automobile has created. The very communities which were raised on twenty and thirty-minute headways are precisely those with the highest percentage of private ownership automobiles. The auto owner, his family and his friends have become used to starting off at once and at higher than car speeds, as well. How can we expect him to patronize the street railway with the single-track operation that makes a delay in one direction produce another in the opposite direction?

#### PARTIAL OR COMPLETE BUSING OF OUR SMALLER CITIES

The one-man safety car has rescued many railways that could profitably go to a ten-minute, seven and one-half-minute and five-minute basis; but there are scores of roads or parts of roads where such headways are out of the question. Naturally, when one has to maintain the paving for a route with a twenty or thirty-minute headway, rail operation can no longer be considered. The revenue from two or three starved cars an hour cannot pay for wages, power, investment, overhead, track, in addition to the wear of paving by motor vehicles. The only answer short of total abandonment is the bus. Then, at any rate, the equivalent of a double-track line will

be obtained as regards reliability of headways. A second advantage is that the routes can be altered at will until the most profitable or least losing is determined. A third advantage is that short loops can be operated, as with two buses running always in opposite directions a passenger has the choice of waiting full headway interval or getting aboard sooner for the longer way around.

Two examples of rails no longer in the right place may be mentioned: Case 1 is that of a town having 7 or 8 miles of route in all. Of this, a 2-mile route parallels the main line two blocks away. This 2-mile route never did amount to much as it was too close to Main Street. At present the matter of track renewal and street repaving is up for settlement. This raises the question should the management wipe this rail route and investment off the books and install a bus line several blocks away through a street that really needs service, or throw good money after bad by rebuilding the unprofitable trolley route? It takes a lot of courage to wipe out 25 to 30 per cent of a cherished investment—especially after valuation engineers have solemnly assured the owners that the replacement value of the track was double the original investment! But value and earning power are things apart in this instance.

Case 2 may be named, inasmuch as action has already been taken. This is Everett, Wash., a city of 30,000. The original lines were laid out by a land development company long before Stone & Webster took hold of this property. For some reason the town preferred to grow north and south instead of east and west, so much of the trackage was no longer in the logical place. Furthermore, as franchises were due to expire during the price peak, it was but natural for the railway to postpone extensive rehabilitation as long as possible. Hence, the opening of 1922 found a railway would have cost more for reconstruction than the original system. Bearing in mind the taxes on electric railways compared with similar charges on the same gross business in bus operations, Stone & Webster decided to start from the beginning. The result is a combination motor bus and street car system in which the buses will probably carry the greater share of the traffic. Operation began late in 1922.

No one can tell to what degree other small cities will or can follow

Everett's example. It must be remembered that the lapse of the franchises, the worn-out condition of the roadway and the mal-placement of routes are all dominant factors. In this connection it may be mentioned that several small British municipal railways have considered complete changeover to motor buses, but their engineers have advised them that this would not pay inasmuch as the track was in fair shape, and the routes correctly placed (so far as the writer knows). The main objection raised by them, however, was that the bus system would have to operate sufficiently cheaper to carry all trolley investment and amortization charge plus its own new investment. In other words, it is one thing to supplant a trolley system by ruthless destruction of investment values, and another thing to guard those values.

#### MOTOR BUS RAPID TRANSIT FOR CITIES BETWEEN 100,000 AND 1,000,000

It is good to turn to motor bus possibilities that offer a big field without hurting legitimate undertakings. This is the operation of motor bus express services in cities of rapid transit distances but not of rapid transit population. British practice affords us a broad hint in its operation of suburban motor buses at fares so graduated that there are practically no pick-ups and therefore few stops on the city part of the run. An enormous amount of private automobile operation could be eliminated if the suburbanite was offered a luxurious coach—not a lumbering bus—in which he could speed to town with his particular coterie as in a club car. To be sure, such service cannot be given at street car fares, but it is one way out for communities between 100,000 and 1,000,000 population to help solve their traffic problem. Thirty minutes is as much as most people are willing to spend en route to and from their job. The rapid transit coach de luxe will make this possible. It should be a part of the local street railway system, for otherwise one kind of service would always be poaching upon the field of the other.

#### MANY BUS OPPORTUNITIES IN THE BIG CITIES IN GENERAL

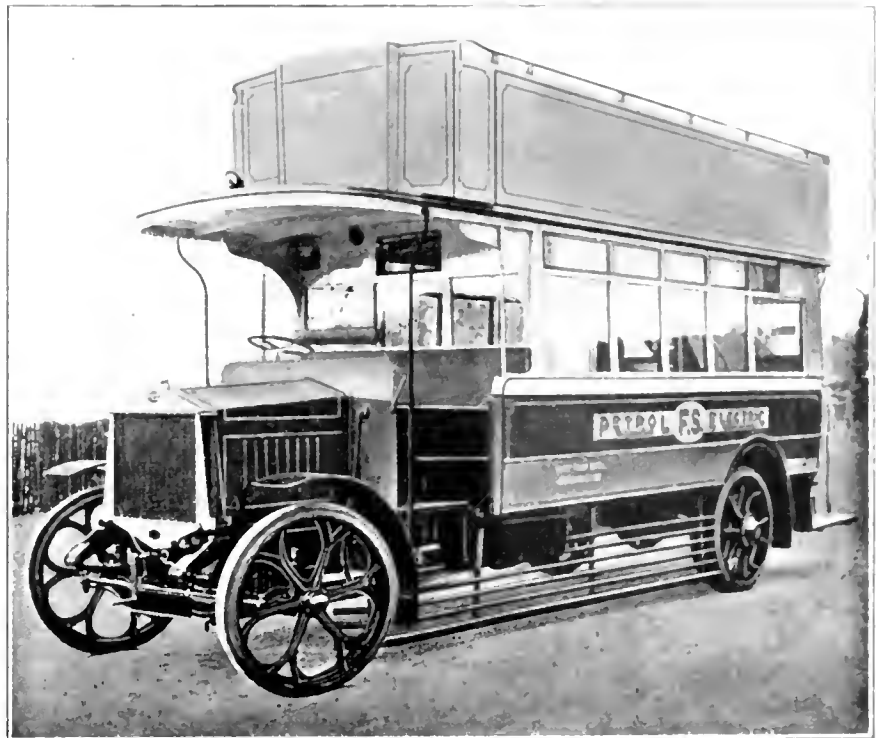
Lastly we come to our larger cities, by which is meant any and all over 100,000 population. Studies indicate that each of them has some

possibility for motor bus operation. This does not imply that the applications would pay for themselves individually, but it does imply that they would be a gain to the local transport system considered as an entity. Not every track route pays by itself. It has to be considered in its relation to the main trunks. So, too, with the bus possibilities. Some of them possess only the merit of cutting down losses from little-used trackways. Others offer the advantages accruing from opening new districts, of keeping out wildcat competition and of cutting down congestion on main lines (through parallels) so that the heaviest traffic can

once more be moved at a profitable schedule speed.

It is true that the minor applications in cities might throw off a profit to individual operators where they bring a loss to company operators, but unlike the country cases first considered the company as purveyor of the mass transportation in a given area must take the lean with the fat, both as a matter of fairness and self protection. It would be just as wrong to permit individual operators to come into a communal area as it would be to fail to protect the country operator against the competition of later comers in his territory.

## New British Gasoline-Electric Bus



*Frost Smith forty-eight-seat gasoline-electric bus now running  
on the streets of London*

**T**HERE are now being put on London streets a number of gasoline-electric buses which show differences, which are held to be substantial improvements, from existing designs. Whether the new buses will substantially compete with those of the London General Omnibus Company remains to be seen, but meanwhile it is of interest to note some points of the chassis construction.

This machine has been designed by Percy Frost Smith, who was formerly associated with Tilling-Stevens

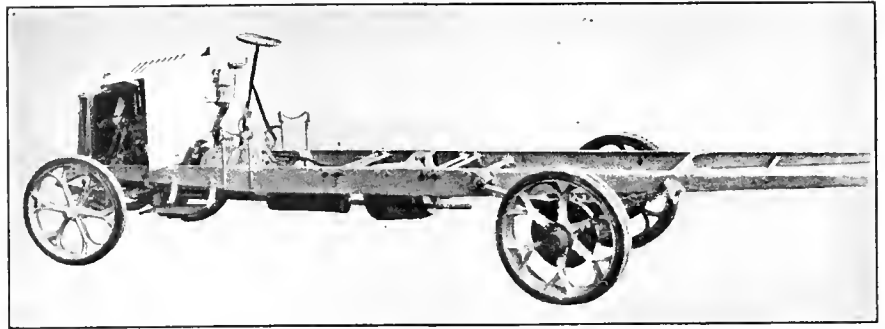
Motors, Ltd., Maidstone. (On page 283, May issue, the Tilling-Stevens gasoline-electric bus was described.) The chassis is simple and strong, with a pressed-steel frame. The four-cylinder engine develops 40 hp. at 1,000 r.p.m. The crankshaft is of high-tension steel. Forced lubrication is employed. A specially designed compound-wound dynamo is driven by the engine and is cooled by a fan. The dynamo drives a series-wound motor whose yoke is bolted to the main members of the frame to form an additional brace.

A novel feature is the patent combination controller, the design of W. P. V. Powell and Mr. Frost Smith, which includes four elements—starting switch, speed regulator, electric brake, and positive magnetic stop. The positive means of preventing the driver from moving from a forward to a reverse position or vice versa while current is flowing is a valuable feature, while the electric brake means easy and safe control. Speed is regulated by resistances in the dynamo and motor fields, these being cut in or out by a lever connected to a sleeve operating the necessary segments. By a continuation of its movement, the same lever brings into action the electric brake. By this brake the driver has control of his vehicle without recourse to the mechanical brake down to a speed of  $2\frac{1}{2}$  m.p.h., regardless of the severity of the grade. The usual mechanical brakes are also fitted.

The bus is electrically lighted by current from a storage battery which is charged from the dynamo. An automatic cut-out and pole changer cut off the charging current when the voltage of the dynamo falls below that of the battery, and also provide that the battery continue to be properly charged should the polarity of the generator be reversed.

In this apparatus there are two solenoids, energized from the dynamo. The plungers of the solenoids are permanent magnets connected by a crosshead of non-magnetic material. The arms of the crosshead carry insulated contacts, which in operation make contact with either of a pair of brushes connected with the dynamo. In practice, the battery being disconnected, the generator is run up, the changing switches closed, and at a predetermined voltage the solenoids are energized.

The solenoid plungers are attracted either up or down according to the polarity of the dynamo. Thus the insulated contacts are brought into contact with one or the other of the brushes. On finding the correct polarity of the dynamo in relation to the polarity of the battery, the latter is then connected to the circuit and charging commences. When the voltage of the dynamo falls below a predetermined value, a V-spring brings the contacts to a neutral position, thus breaking the circuit to the battery. Should the dynamo build up its voltage in the opposite direction, contact is made with the opposite pair of brushes, and by means of



*Frost Smith gasoline-electric bus chassis*

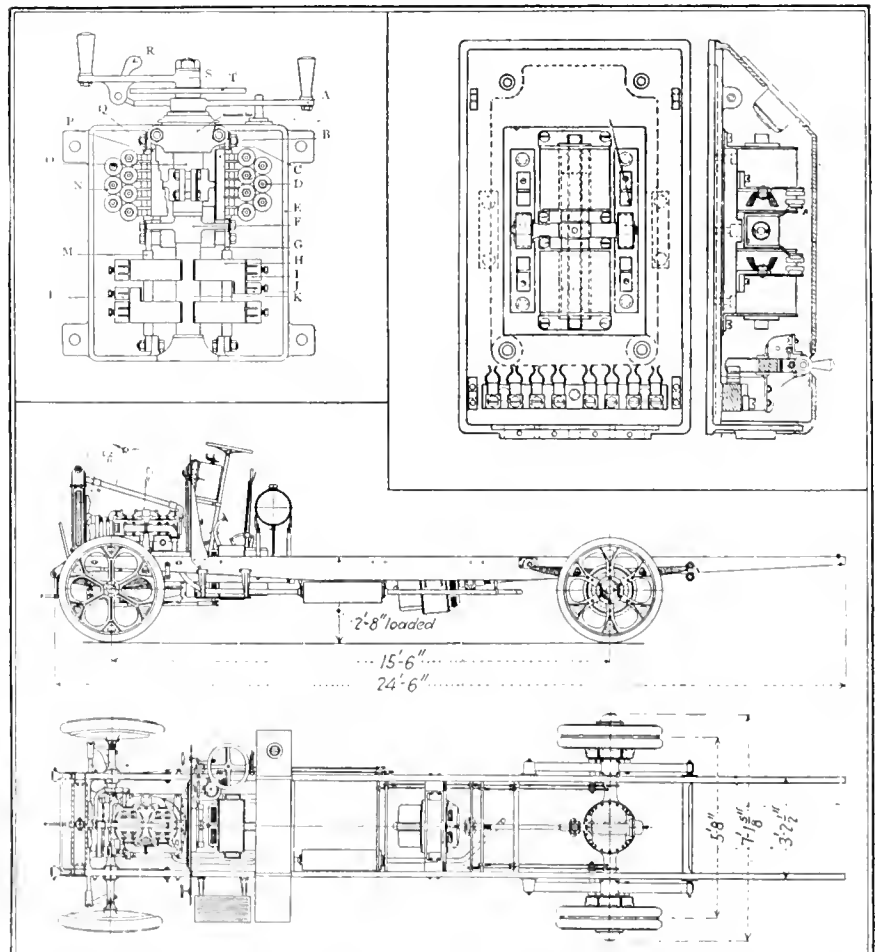
cross-connections the battery receives its charge in the right direction.

A three-point spring-drive coupling connects the engine and dynamo. The load is automatically taken equally by the three driving springs. The propeller shaft from the motor

connects with the rear axle, the case of which is a one-piece steel forging, heat-treated after machining. Separate hard-steel sleeves form the main bearings, and the sleeves are easily renewable. Torque and radius rods are eliminated, the stresses

- A—Dynamo and motor-field and brake lever.
- B—Motor-field resistance contact segment.
- C—Removable bar carrying contacts and motor and brake resistance units.
- D—Motor-field and brake resistance units.
- E—Main frame of aluminum.
- F—Magnetic locking sector plate.
- G—Removable bar carrying main and brake contacts.
- H—Reversing switch contact drum.
- I—Main contacts.
- J—Brake contact.

- K—Insulated switch spindle.
- L—Brake contact.
- M—Removable bar carrying main and brake contacts.
- N—Dynamo-field resistance units.
- O—Insulated sleeve carrying contact segments.
- P—Removable bar carrying contacts and dynamo resistance units.
- Q—Dynamo-field resistance contact segment.
- R—Brake locating trigger.
- S—Reversing switch lever.
- T—Indicator plate.



*Views of Gasoline-Electric chassis. Above, at left—Combination controller. At right—Automatic cutout and pole changer*



being taken through springs. The worm-case unit can easily be removed from the main axle case. A bevel-type differential gear is employed, and details are of robust design.

An I-beam section axle and ball and socket joints are features of the front axle. Special attention

has been given to the springing of the chassis. Front and rear road wheels are of the same diameter, and are made of cast steel. Twin types are as usual fitted to the rear wheels.

The double-deck body is not unlike the latest type of the London General Omnibus Company. This vehicle is

painted externally a rich blue color, and on the side panels is the legend, "Petrol E.S. Electric." It is thus quite a contrast in color to the L.G.O.C. buses, which are painted a brilliant red. The seating accommodation is for forty-eight; twenty-two inside and twenty-six on top.

## Many Operating Changes Are Being Made in Chicago Bus Service

**Traffic on North Side Carefully Analyzed—South and West Side Operations Cover 115 Miles of Routes and Will Require 650 Buses and Four Operating Garages—Two Subsidiaries, with the Same Officer Personnel as Operating Company, Formed to Design and Construct the Buses**

ONE of the first steps taken by the new management of the Chicago Motor Coach Company, after taking hold of operations, was a complete study of the traffic conditions existing on the lines running north of Michigan Avenue. This study resulted first in the establishment of new turn-back points in the evening rush hours, and in the morning rush in dead-heading buses from the Rosemont garage to predetermined points in order more fully and adequately to serve the bus riders by assuring them a seat on the first bus instead of having to wait their chance. This simple change in operation also enabled passengers to reach their destination within a minimum of time, since time lost waiting to board a bus has been greatly reduced. Then, too, as the public has found out that seats can be obtained promptly, upon arrival of the bus, new traffic has resulted, and it is not uncommon for passengers to walk several blocks to travel by bus.

On Jan. 4, 1923, an entire new schedule was put into effect. This schedule provides for rerouting changes in the downtown or Loop District to facilitate movement, thereby decreasing the delays due to other vehicular interference. Through service from the Loop to Devon Avenue was put on a ten-minute headway, but instead of passing through the Loop via Jackson Boulevard, State and Washington Streets as heretofore at all times, the buses are routed around the block

bounded by Washington, State and Randolph Streets during the period from 7:30 a.m. to 6:30 p.m.

This rerouting results in a saving of 103 miles per day and decreases the number of buses required to fill the schedule by two. Incidental to the new schedule, running time points were established for all bus operations and drivers are held to strict accountability to maintain their running time. The accompanying table built up from the allowed running time gives the schedule speed in miles per hour over different sections of the routes that go north on Michigan Avenue.

Short-line service is operated every ten minutes all day from the Loop to Edgewater Beach, Clark Street and Wilson Avenue, except that the Clark Street and Wilson Avenue runs are combined after 7:30 p.m. until midnight. On these three routes the trip through the Loop District is also shortened during the evening rush hours by turning off Michigan Avenue at Monroe Street, two blocks north of Jackson Boulevard. This operation not only results in a saving of four minutes in running time per trip but also of 58 miles per day, both of which redound to the benefit of the traveling public. The company realizes that undoubtedly some operators will criticize severely this method of rendering service, but it believes that when it becomes possible to walk faster than to ride on the buses it is good operation to avoid such traffic congestion.

In the morning during the peak hour additional service is run to the Loop on ten-minute headways from six other points. In the evening rush hours, in addition to the routes previously mentioned, other northbound service is run on a ten-minute headway from the Wrigley Building and from Lake Street to Devon, the northern terminus.

### FIGURES SHOW INCREASE

Figures on the comparative business for December, 1921, and December, 1922, and for January, 1922, and January, 1923, follow:

	December, 1921	December, 1922	Per Cent Increase
Buses miles	127,684	177,898	39.26
Round trips	7,075	10,811	43.22
Passengers, incl. driver	402,025	731,899	48.70
Seats filled	891,145	1,308,244	62.40

	January, 1922	January, 1923	Per Cent Increase
Buses miles	122,284	162,805	37.71
Round trips	7,162	12,419	73.90
Passengers, incl. driver	445,471	781,009	78.13
Seats filled	776,262	1,016,844	82.00

Among other things, the new management has instituted a systematic checking of traffic at three or four points along the line so as to determine and keep posted on any variations in riding habits that might necessitate changes in schedules. It is only by such constant checking that the information so essential in building schedules can be obtained. With such facts known, buses can be put at the places when and where the people want to ride.

All of the efforts of the management have not been confined merely to revamping the schedules more

nearly to meet the needs of the traveling public. Many changes have been instituted in the shops, including a systematic plan for the inspection, cleaning and overhauling of buses, patterned very largely, as might be supposed from the previous experience of the present managers, on the Fifth Avenue Coach Company's practice.

New equipment includes twenty new Type K double-deck coaches built in Chicago, ten Type L double-deckers and one Type J single-deck coach of Fifth Avenue design and construction. Forty of the front-wheel drive buses have also been thoroughly overhauled, renovated and repainted both inside and out, making them as attractive in appearance as the newer model buses.

The inspection service in the shops calls for examination every night and a more thorough inspection every 2,000 miles. This practice alone has resulted in the elimination of practically all road delays due to failures of equipment, so that a passenger now feels assured on boarding a bus that he will reach his destination without unforeseen circumstances preventing.

An analysis of the delay reports for the month of January, 1923, three months after the property changed hands, indicates that it is not uncommon practice to make a day's schedule without a failure in equipment of any kind. This of itself has done much to restore the confidence of the riding public.

#### THE PLAN AND SCOPE OF THE NEW ORGANIZATION

The plan and scope of the present management divides itself into five natural divisions:

The local operating company will be known as the Chicago Motor Coach Company and will cover about 88 miles of route over what is unquestionably a most wonderful boulevard system. In addition it will cover about 30 miles of city streets, making a total route mileage of approximately 118 miles. On the south, operations will extend to South Chicago, approximately 5.15 miles from the Loop; to the west, to the city limits at Austin Boulevard, or about 8 miles from the Loop. On the north side present operations will be extended to the city limits, at the beginning of Evanston, making the distance from the Loop approximately 11 miles. It is anticipated

that when all routes are in operation and fully equipped nearly 650 buses will be needed to fill the schedules. To complete this undertaking it is estimated that the final investment required, including allowances for garages and shop facilities that will of necessity have to be furnished to maintain and operate this large fleet of buses, will amount to \$6,000,000. This operation will be by far the largest of its kind in this country, the exception to the largest in the world being the London General Omnibus Company in London.

There will be two garages on the South Side of 40,000 and 50,000 sq.ft. respectively. On the West Side but one garage of 70,000 sq.ft. area is planned. At these garages everything pertaining to repairs and general maintenance will be done, but all annual overhauling, repainting, etc., is to be done at some central point.

As has already been stated in the columns of BUS TRANSPORTATION, the company now holds franchises and operating rights for its contemplated South Side operations. It is ex-

pected that service will be inaugurated on a part of the lines on April 1 and will continue to expand as rapidly as equipment can be secured and the necessary garages for operating purposes constructed.

matter under advisement. With favorable action on the part of the commission the company anticipates that operation will be started by July 1 of this year in a small way over a part of the routes.

All buses are to be built by a subsidiary of the Yellow Cab Manufacturing Company to be known as the Yellow Coach Manufacturing Company. Except for the financial relationship it will be in every respect a wholly independent organization and under a separate management. The manufacturing plant adjoins that of the parent company on West Dickens Avenue. Already 34 acres of land have been purchased and it is planned to lay out the plant in four separate units, each unit occupying 100,000 sq.ft., the first of which is now under construction. The plant has been designed along the most modern lines, and through the installation of a combination of crane and telferage system manual handling will be reduced to a minimum. The capacity of each of these four separate units will at the start average at least five buses per day, so that when the plant is at its maximum

#### Operating Schedule Information Com

##### NEW RUNNING TIME AND SPEEDS BY SECTIONS

Section	Section Mileage	Cumulative Mileage	6:30 A.M. to 9:30 A.M. and 6:30 P.M. to 1:00 A.M.				9:30 A.M. to 2:00 P.M.			
			Running Time In Section	Speed In Section	Cumulative		Running Time In Section	Speed In Section	Cumulative	
					Running Time	Speed			Running Time	Speed
Devon to Balmoral.....	1.565		7	13.4			7	13.4		
Balmoral to Argyle.....	0.397	1.962	2	11.9	9	13.08	2	11.9	9	13.0
Argyle to Lawrence.....	0.292	2.254	3	5.85	12	11.27	3	5.85	12	11.2
Lawrence to Wilson.....	0.260	2.514	3	5.20	15	11.06	3	5.20	15	11.0
Wilson to Montrose.....	0.253	2.767	2	7.60	17	9.77	2	7.60	17	9.7
Montrose to Irving Park.....	0.505	3.272	4	7.60	21	9.35	4	7.60	21	9.3
Irving Park Boulevard to Pine Grove.....	0.466	3.738	2	14.00	23	9.75	2	14.00	23	9.7
Pine Grove to Melrose.....	0.988	4.726	4	14.80	27	10.50	4	14.80	27	10.5
Melrose to Diversey.....	0.626	5.352	3	12.50	30	10.70	3	12.50	30	10.7
Diversey to Chicago.....	2.651	8.003	10	15.90	40	12.00	10	15.90	40	12.0
Chicago to Kinzie.....	0.493	8.496	2	14.80	42	12.14	2	14.80	42	12.1
Kinzie to Michigan and Washington.....	0.457	8.953	3	9.15	45	12.00	4	6.85	46	11.2
Michigan and Washington to State.....	0.165	9.118	1	9.90	46	11.90	2	4.95	48	11.4
Total.....	9.118				46	11.90			48	11.4

All day average speed 11.55 miles per hour.

pected that service will be inaugurated on a part of the lines on April 1 and will continue to expand as rapidly as equipment can be secured and the necessary garages for operating purposes constructed.

As for the West Side operations, the company reports it has secured the necessary franchises from the West Side Park Board and that the hearings before the Illinois Commerce Commission to prove necessity and convenience have been completed. The commission now has the

working capacity at least twenty completed buses can be turned out daily. At present only one unit is being built. It is expected to have this completed the latter part of March so that during the month of April one bus per day can be turned out. During the month of May plans call for two a day, and for three a day in June, after which it is hoped to keep the plant working at full capacity.

In order to insure a supply of engines for its buses the engine works of the Root & Vandervoort organiza-

tion at Moline, Ill., were purchased. All the equipment, tools, patterns, etc., were included—in fact, everything except the manufacturing buildings. These have been leased for the present. A separate company has been organized to take over the engine works and it bears the same relation to the Yellow Cab Manufacturing Company as the Yellow Coach Manufacturing Company. While it is financed by the parent company it will have an independent operating organization, which will be known as the Yellow Sleeve Valve Engine Works, and will have the sole manufacturing rights of R & V motors both for buses and for passenger cars. This plant will have a maximum output of fifty engines per day. The engines, which will be constructed for bus operation, will contain many improvements making for greater economy in maintenance and in the consumption of gasoline.

The Yellow Coach Manufacturing Company also plans a consulting service for those who contemplate the installation of motor coach service. This service is to be at the disposal of those who purchase or

type of equipment; but the company will be prepared to assist in a financial way.

In territories not at present served, preliminary surveys for motor coach installations will be conducted and attempts made to interest local capital for the purpose of organizing local operating companies. Failing in this, an operating subsidiary company will be organized and financed to carry out the plans for motor bus service.

#### EQUIPMENT DESIGNS

Already the manufacturing organization has developed two designs of chassis on which a multiplicity of body designs can be mounted. All told, there are five types of bodies that can be mounted on one type of chassis. These bodies cover not only open-top double deckers but also inclosed for one or two-man operation. This same type of chassis is also to be used under a thirty-passenger single-decker so that the excess weight of standees can be accommodated without fear of over-loading so far as weight is concerned. The second type of chassis is for a

type of bus seating twenty-five passengers and capable of a sustained speed of 40 m.p.h. and a maximum speed of 50 m.p.h.

6. A light coach de luxe accommodating a minimum of 12-20 passengers for country club, hotel, school, etc.

In treating with labor in its manufacturing activities the company has based its wages upon the output of honest co-operative and individual effort, so that those who produce will participate in two ways.

First. In direct payment for individual effort, which includes a general basic rate of pay for at least a day's work. This will be determined on a basis well within the productive ability of the ordinary worker or workman. As an incentive to the ambitious, and industrious worker, there will be a liberal reward for anything produced in excess of what might be considered a fair day's work. There will be incorporated in the plan also certain safeguards against the possibility of overwork and exhaustion by the more catch and greedy.

Second. In sharing with the stockholders in profits produced through co-operative effort in excess of an amount which will be predetermined and agreed upon as a fairly liberal return to the investors.

#### ared—Chicago Motor Coach Company

OLD RUNNING TIME AND SPEEDS BY SECTIONS

2.00 P. M. to 6.30 P. M.				6.30 A. M. to 12.00 Noon and 6.30 P. M. to Close				12.00 Noon to 6.30 P. M.			
Running Time In Section		Cumulative Running Time Speed		Running Time In Section		Cumulative Running Time Speed		Running Time In Section		Cumulative Running Time Speed	
7	13.4	9	13.08	7	13.4	9	13.08	7	13.4	9	13.08
2	11.9	12	11.27	2	11.9	12	11.27	2	11.9	12	11.27
3	5.85	15	11.06	3	5.85	15	11.06	3	5.85	15	11.06
3	5.20	17	9.77	3	5.20	17	9.77	3	5.20	17	9.77
2	7.60	21	9.35	2	7.60	21	9.35	2	7.60	21	9.35
4	7.60	23	9.75	4	7.60	23	9.75	4	7.60	23	9.75
2	14.00	27	10.50	2	14.00	27	10.50	2	14.00	27	10.50
4	14.80	30	10.70	4	14.80	30	10.70	4	14.80	30	10.70
3	12.50	40	12.00	3	12.50	40	12.00	3	12.50	40	12.00
10	15.90	42	12.14	10	15.90	42	12.14	10	15.90	42	12.14
2	14.80	46	11.70	2	14.80	46	11.70	2	14.80	46	11.70
4	6.85	48	11.45	4	6.85	48	11.45	4	6.85	48	11.45
4	2.48	50	11.00	4	2.48	50	11.00	4	2.48	50	11.00
		50	11.00			48	11.45			50	11.00

All day average speed 11.22 miles per hour.

who are contemplating purchasing motor bus equipment.

In cities or localities now served by existing means of transportation, it is the purpose of the organization not to compete, but to co-operate in devising ways and means of installing motor coach service as a service supplemental to existing means of transportation. Where necessary and justified by local conditions, however, this co-operation will by no means end with only advice and counsel and the supplying of the proper

smaller and lighter vehicle and will have a capacity of but eighteen passengers.

More details of each vehicle follow:

1. A double-deck two-man bus accommodating sixty-nine passengers.

2. A double-deck pay-as-you-enter one-man bus accommodating fifty-eight passengers.

3. A Pullman de luxe single-deck pay-as-you-enter one-man bus capable of seating thirty and accommodating twenty-five standees.

4. An inclosed upper-deck bus of either one or two-man type.

5. A high-speed enlarged limousine

#### Night Service Extended

PICKWICK STAGES, Northern Division, Inc., has announced that another through stage between San Francisco and Los Angeles will be added to its schedule. The time of departure on the new run from both ends will be 12 o'clock midnight. This will make a total of five daily schedules in each direction without layover between the two cities, which are 455 miles apart via the highway. There are also two daily schedules each way on which an overnight stopover is made en route.

Under the new program the departures from each terminal on through runs will be as follows: 7 a.m., 8 a.m., 2:45 p.m., 7 p.m. and 11:59 p.m. Cars on the 7 a.m. run do not handle any local passengers, but all other runs carry passengers between all points en route. The schedules as now arranged have been found to be such that the time of passing through the various points closely check with the demand for transportation and a desirable uniformity of loading is assured. The business on the San Francisco-Los Angeles run is said to have practically doubled the last year.

# Two Bus Lines Aid Local Transportation

**The Youngstown Trolley Car Company Adopts Buses as a Medium of Transportation to Two Residential Districts—The Bus Routes, Which Reach the Center of the City, Are Operated Under the Same Conditions as the Trolley Lines—The Rates of Fare Are the Same and the Passengers Can Get Transfers from the Cars to the Buses and Vice Versa**

**W**HEN the history of motor transportation is written, it must be recorded that the Youngstown (Ohio) Municipal Railway was among the first of the railways of the country to adopt the motor bus as an adjunct to its urban electric service.

On Sept. 24, 1922, seven Republic motor buses of the street car type began operations on regular schedules over two routes in the city of Youngstown. These lines serve rapidly developing residential sections, the Lincoln Park and the Crandall Park districts. Direct transportation from the business district to their homes is thus afforded residents of these sections that are distant from street car lines. The Crandall park line also performs a valuable service to the city in that it serves the hundreds of students attending the new Rayen School. The Lincoln Park line buses have Federal and Champion Streets, in front of the Central Store, as their downtown terminal. On the outbound trips they proceed east through Federal Street and Wilson Avenue to Rigby Street, where they depart from the street car line and go up Rigby to Jackson, to Shehy and thence to Lincoln Park. Inbound they traverse Oak Street to Himrod, Himrod to Garland, thence into Rigby, Wilson and Federal Streets to the central terminal.

The Crandall Park line has its central station in Wick Avenue at the same point as the Elm Street cars. The route for them has been so laid out that they barely touch the street car line at any point. They proceed north in Wick to Broadway and thence to Elm and on north to Benita, through Fifth, Crandall, Guadeloupe, Belmont, Foster (connecting with the North Avenue car line terminal), Belmont, Crandall and back to the center of the city.

A third route which would serve the Cochrane Park district on the south side of the city is under consideration. An ordinance recently



*All aboard for Crandall Park*

*Looking forward—Note the fare box location and the overhead register for showing how many passengers ride on weekly passes. Hand rails on the roof are used instead of straps for they provide better steadying powers.*



passed the Youngstown Council authorizing the purchase of eleven new buses, seven of which are to be used on the Cochrane Park line.

At present the company operates seven buses. The bodies were constructed by the Bender Company of Cleveland to the design of the Pennsylvania-Ohio Company, and are mounted on Republic chassis which have the Knight sleeve-valve engines. Pneumatic tires, 36 x 6, are used exclusively. The rear wheels have dual tires.

The very best of workmanship and design was put into the construction of the bodies. All framework is of second-growth, air-dried ash or oak. Main sills are mortised and heavily braced, while the panels are of sixteen-gage aluminum. The windows are equipped with special anti-rattling devices and weather strips,

and a protecting wire guard runs along the side of the windows.

The service door of the jack-knife type at the front and the low-step shod with safety tread give easy ingress and egress, a feature aided by special illumination at the entrance.

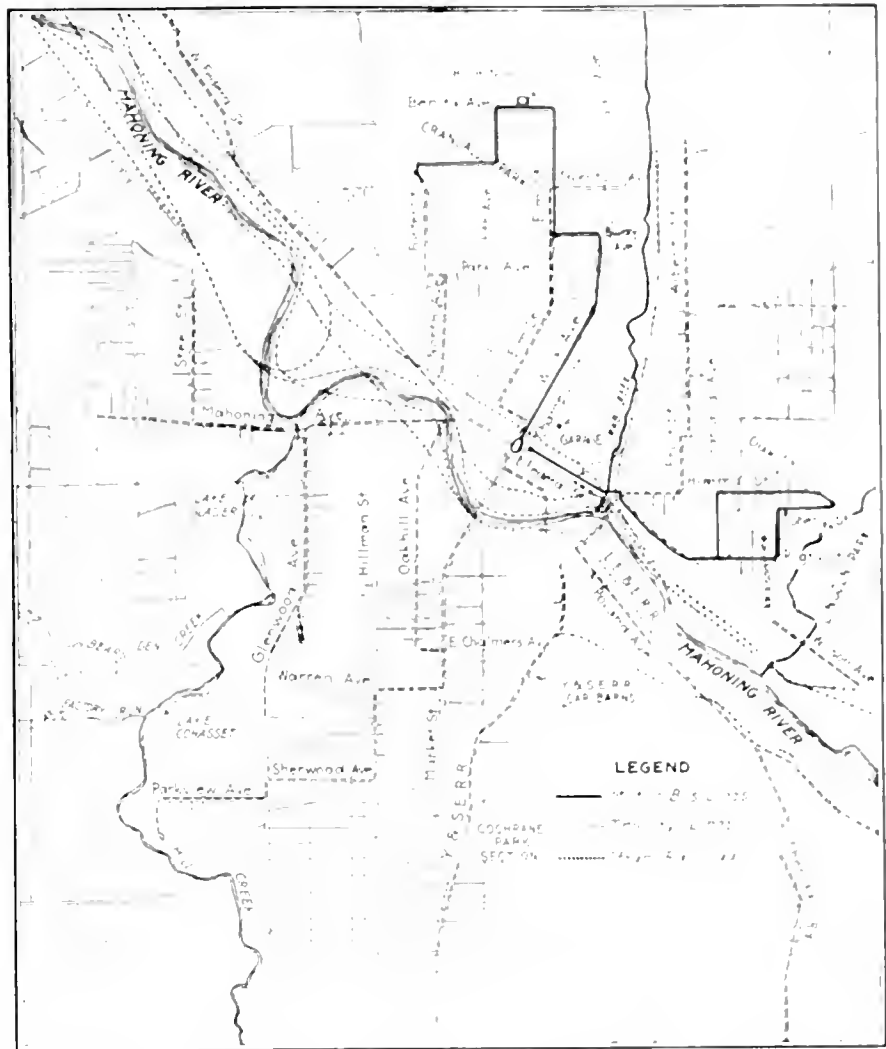
All of the seats are transverse excepting the front seat on the right hand side, which is longitudinal. This not only gives the greatest comfort to the bus riders, but also gives ample space at the forward end of the car to facilitate loading and unloading. All seats are of standard type upholstered in brown leather. They are spaced to give ample room for comfort and for easy passage along the aisle. At each seat is a push button connected with a buzzer to the driver so that passengers can signal the approach to their stops.

#### ATTRACTIVE APPEARANCE AND PASSENGER COMFORT ARE FEATURES

The interior and exterior decorations are in keeping with the general appearance of the buses. Lighting is afforded by six dome electric lights in the roof. At the top in front are two green designation lights and in the rear at the top two red lights, these and the special lighting at the entrance being in addition to the lights required by law. The same type of roller destination signs as used on the street cars are installed on the buses.

It might be said in passing that the Youngstown Municipal Railway is a subsidiary of the Pennsylvania-Ohio Electric Company, which also operates the Pennsylvania-Ohio Coach Lines mentioned in previous issues of BUS TRANSPORTATION. Needless to say the company has striven to attain on the urban routes the same high degree of comfort, safety and efficiency, combined with elegance of appearance, as developed in its interurban service.

A yearly local license fee of \$10 per bus for owners is required by a city ordinance, which also calls for a \$5 fee for each driver. According to a recent decision rendered by the Municipal Court, the railway does not come within the terms of this measure as its buses are auxiliary and supplementary to the trolley service. This decision resulted from an action brought by an independent operator alleging violation by the railway of an overcrowding clause in the ordinance. These licenses are therefore no longer paid. The in-



*The relation of the local bus lines to trolley lines in the city of Youngstown*

ternal revenue tax is \$20, and the Ohio State auto license is \$36.45 per bus.

According to the provisions of an ordinance adopted Dec. 13, 1921, an indemnity insurance policy or bonds to the extent of \$10,000 per bus must be filed with the city.

The prevailing rates of fare on the buses are the same as on street cars. Weekly passes, good for unlimited rides, are issued for \$1.25, coupon tickets are sold six for 50 cents, while the cash fare is 9 cents, with an additional charge of 1 cent for transfers from bus to car and vice versa.

The Lincoln Park route is 4.2 miles in its round-trip length and a ten-minute headway is maintained from 5 a.m. to 12:40 a.m. The Cranford Park line is 6.7 miles in its round-trip length with a twelve-minute headway from 5:20 a.m. to 12:40 a.m.

Jitney competition with large touring cars is active on both lines.

More than 135 touring cars are operated over four routes in the city.

Fares are collected as the passenger leaves the bus. A locked fare-box is used for the cash and ticket fares. Weekly passes are registered on an overhead register. Transfers are collected but are not registered.

During the week of Dec. 18, 1922, the sales of weekly passes by the railway company on cars and buses amounted to 10,096, which was declared to be a record. For the week of Jan. 29, 1923, pass sales amounted to 10,065. The bus lines are credited with aiding materially in this increase.

The maintenance shop for the buses operated by the Youngstown Municipal Railway is located on East Commerce Street, almost in the heart of the city. Here a force of two mechanics and three helpers, one of whom is also a washer, is maintained. The schedule at the East Commerce Street garage is to wash, inspect, and clean two buses per day.

Form 828 CI-51 5-22-50M Y P, Co

### The Youngstown Municipal Railway Company

#### CONDUCTOR'S DAILY REPORT

Date        192       

Run No.        Car No.        Register No.        Key No.        Fare Box No.        Cash Box No.       

Conductor Operator        No        Motorman        No       

Car Received From        Line        Punch       

By Whom Relieved        Time On        Time Off        Hours        Mileage       

Cash Register Opening        Closing        Total        Total Cash       

Ticket Register Opening        Closing        Total Tickets       

Transfers Issued Opening No.        Transfers Issued Closing No.        Sold       

Starting Point	Time	Trip No.	Cash Fares	Cash Tickets	Student Tickets	Comp. Tickets	Transfers	Total Passengers	Starting Point	Time	Trip No.	Cash Fares	Cash Tickets	Student Tickets	Comp. Tickets	Transfers	Total Passengers
		1									21						
		2									22						
		3									23						
		18									38						
		19									39						
		20									40						
<b>TOTALS</b>																	

Form of daily report used by bus driver, showing traffic handled by trips, and total for his day's work. On the reverse side notation must be made of delays, trips lost, etc., and the reasons why

This brings a bus in every 600 to 800 miles. The tire pressure in each of the six buses is checked up nightly. The required pressure in the front tires is 100 lb. and in the dual rear tires 100 lb. on the outside tires and 95 lb. on the inside tires. The reason for the difference in pressure is on account of the crown in the roads, it being believed that more weight is carried on the outside tires than on the inside.

At the garage the company has its own gasoline filling tanks and has a contract with the Texas Company for fuel. Bowser pumps located at the curb provide the means for filling the tanks on the buses.

The garage equipment consists of:

One valve grinder, manufactured by the Franklin Machine & Tool Company, Springfield, Mass.

One arbor press, manufactured by

the Manley Manufacturing Company, York, Pa.

One electric drill, semi-portable type.

One Alemite grease gun (motor driven).

One motor-driven air compressor, manufactured by the Union Engine & Manufacturing Company, Butler, Pa.

One vacuum cleaner.

Performance records of each bus are kept at the garage. Here the amount of gasoline and oil used daily by each bus is recorded in a special form, likewise a daily trouble report, showing the buses assigned to each route and if for any reason they have to be pulled in. The cause for the pull-in must also be entered under the heading "Nature of Trouble," and under the heading "Disposition by Transportation Department" is shown the number of the bus substituted. In the last

column the garage foreman, who, by the way, is under the direct supervision of A. B. Creelman, indicates what the mechanical trouble was that caused the pull-in. The reports are kept in duplicate and one copy goes to the manager daily for his information.

Records are also kept of the life of tires, showing the bus on which they are put, the dates on and off and the mileage run, which is taken from the conductors' daily report card of trips made on the various lines.

The Crandall Park route is very hilly. For 200 ft. a 10 per cent grade has to be surmounted, for 1,000 ft. a 4 per cent grade, and there is more than a half mile that will average a 3 per cent grade. The

Bus	Gas	Oil	Mileage	Insp
1				
2				
3				
4				
5				
6				
7				

	FL	FR	RRO	RR1	RLO	RL1
1						
2						
3						
4						
5						
6						
7						

Signed \_\_\_\_\_

Signed \_\_\_\_\_

Form used to keep record of gas and oil used, and the tire pressures in each tire.

company's drivers on this line have been taught to brake with the hand brake, which is on the rear wheels, and to stop with the foot brake, which works on the propeller shaft, while the hand brake is still on. The push-away type of hand brake that stays put is used.

J. B. Stewart, Jr., is the general superintendent of operations.

Form 829 CI-51 5-22-50M Y P, Co

### DAILY TROUBLE REPORT

Date        192       

CAR No.	TIME	LOCATION	NATURE OF TROUBLE	DISPOSITION BY TRANSPORTATION DEPARTMENT	DISPOSITION BY MECHANICAL DEPARTMENT

Signed \_\_\_\_\_

INSPECTOR

Signed \_\_\_\_\_

MASTER MECHANIC

The same form of trouble report is used for both buses and trolley cars.



Six Months of Operation Has Developed Substantial Traffic — Power Is Purchased from Hydro Power Commission — Energy Consumption Is One Kilowatt-Hour per Bus-Mile

## Trolley Bus Operation in Toronto

*By W. Forsyth*

Superintendent Bus Operations Toronto (Ont.) Transportation Commission

IN AN ARTICLE which appeared in the issue of BUS TRANSPORTATION for March, 1922, three months previous to the inauguration of trolley-bus service in Toronto, details were given of the bus which had been selected by the Toronto Transportation Commission for this service. Regular passenger service was inaugurated by the commission in June. Two of the four buses purchased maintain a normal traffic schedule on what is known as the Mount Pleasant route, having a round-trip length of approximately 2½ miles. One end of the line connects with the Toronto & Yorke Radial Railway at Yonge and Merton Streets, this system in turn connecting with the trolley system of the Toronto Transportation Commission on Yonge Street.

The trolley bus route extends east about 1½ miles on Merton Street at a right angle to Yonge Street, then turns north and parallel to the Toronto & Yorke Radial Railway for approximately ¾ mile. The entire route is on macadam and brick roadways.

On the route there are only two rather level sections, the remainder being a series of ascending and descending grades. On Merton Street near Mount Pleasant Road there are two short grades of from 4 to 5 per cent, and a longer grade on Mount Pleasant Road averaging 3 per cent.

The section of Toronto served by the trolley bus is rather sparsely settled, consequently the heaviest traffic is during the morning and evening rush periods, each of which is of only about an hour's duration. On Saturday most of the industrial concerns close at noon, making the peak of traffic at noon instead of in the evening. During these rush periods the bulk of the traffic is carried from the Toronto & Yorke Radial in the direction of the up-grade. Most of the passengers make the continuous trip from or to the end of the line at Eglinton Road and



*Four of these trolley buses are in operation in Toronto*

Mount Pleasant Road. There are, however, a number of cross streets at which stops are made. With the present arrangement for transfer service, through-section tickets are sold, thereby permitting the holder to transfer from the trolley bus to the Toronto & Yorke Radial and then to the commission railway system or vice versa. Such tickets are sold at four for 25 cents. The attractive service offered by the trackless trolley system has been largely responsible for the enormous increase over the traffic handled by the gasoline buses previous to the installation of the present system.

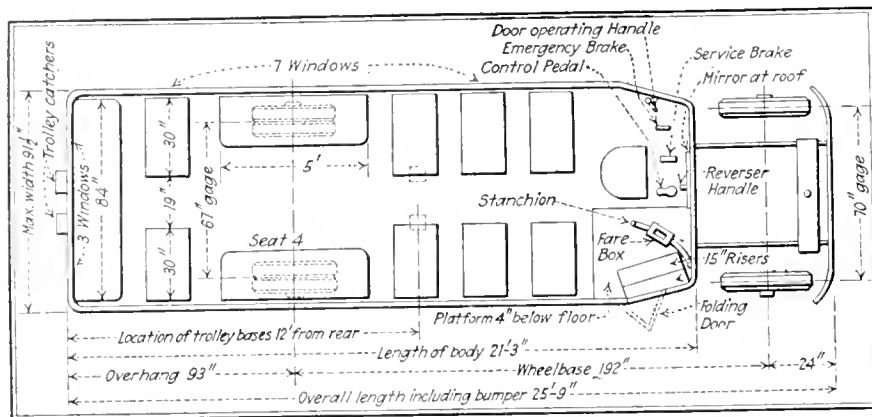
Throughout the week, except Saturday and Sunday, the buses make a total daily mileage of 334 miles. On Saturday and Sunday they average 350 and 230 miles respectively. During the rush-hour periods three buses are used on the route, but in normal service two buses maintain a headway of about ten minutes, making three round-trip runs in an hour.

For the overhead trolley wires, two pairs of wires are used over the entire route. The contact wires are suspended from cross-span con-

struction exclusively, standard line construction, hardware and fittings being used, with the exception of the crossings and frogs, for the overhead line work. Standard suspension and pull-offs were installed using cross-spans in the usual way. All of the cross-spans are sectionalized between contact wires by strain insulators. This requires five strain insulators in a cross-span for two pairs of contact wires, including the insulation at the poles.

Wyes are installed in the overhead construction on both ends of the line. Spring-type frogs are used on both sides of the line, arranged to guide the trolley wheels in the predetermined direction without attention. For crossovers at wyes, uninsulated crossings are used, four being required. Each crossing is sectionalized from one side of the line, but is at the potential of the other side with respect to the bus. A short section of dead line results, owing to the wires being of the same polarity. The buses coast over the dead section.

Power for the trolley bus line is purchased from the Hydro Power



Plan showing general dimensions and seating arrangement of  
Toronto Transportation Commission trolley bus

Commission, which also feeds the two railway systems. The bus line is fed from the T.T.C. substation located on Yonge Street near Merton Street. This requires a feeder of about  $1\frac{1}{2}$  miles on Merton Street. The all-day average voltage at the driving motors is approximately 500. Observations show that approximately 1 kw.-hr. per bus-mile is used at the bus, including lighting but not heating.

#### DESCRIPTION OF THE BUS

The accompanying sketch shows the general arrangement and approximate dimensions of the bus. As was explained in detail in the earlier article, the body is built on a Packard Model E D truck chassis, which has a normal rating of from  $3\frac{1}{2}$  to  $4\frac{1}{2}$  tons. The standard chassis has been slightly modified for trolley bus application, the trolley bus having a wheelbase of 192 in. The bodies, built by the Canadian Brill Company, are a framework of steel covered with Plymetl on the sides and roofed with Agasote. Spacious windows all around afford an ample supply of light during the day.

The interior walls of the buses are finished in a cherry red color and the ceiling in a cream colored enamel. The accompanying plan of the bus shows the seating arrangement which accommodates twenty-nine persons comfortably. Standing passengers are not permitted on the Toronto buses.

The fare box is located on a stanchion constructed on the right-hand side of the operator's seat. This stanchion also prevents interference with the operator when passengers are entering or alighting from the bus. During normal service only the door at the front of the bus on the right-hand side is used. However,

there is an emergency door at the rear left-hand side that can be operated with a push button near the operator or by a passenger breaking the glass cover of a lock with spring contact placed directly above the door. The exterior of each bus is finished in the Toronto Transportation Commission's standard colors, red trimmed with a cream enamel, and finished with gold striping and letters.

All wheels are equipped with solid tires, the front wheels having 34x5 and 34x10 (dual 5) for the rear wheels. These tires can be worn to a diameter of about 30 in. before replacement is necessary.

Practically all of the control equipment is housed under the hood of the bus. In this manner practically all equipment is placed in an out-of-the-way but still convenient place. The only parts inside the bus are those switches which the operator must have at his immediate command. The complete motor and control equipment was built by the Westinghouse Electric & Manufacturing Company and installed on the buses by the Canadian Brill Company.

Two current collectors are used on each bus. The bases of the trolleys



A stanchion at the operator's right accommodates the fare box.

are located side by side slightly ahead of the center of the bus.

A building not unlike an ordinary automobile garage has been erected to house the buses. All repair work is carried on in this structure. The buses have not been in service a sufficient length of time to accumulate data on the maintenance of tires, brakes, etc., or comparative data on their operation against that of the gasoline bus or one-man cars.

### Swiss Government Uses Bus to Good Advantage

TRANSITION from horse-drawn government stage to motor bus in Switzerland has attracted much attention. For more than a half century the Swiss government is reported to have operated the stages at a loss, including carrying of mail. However, it was compelled to continue operation to accommodate the tourist traffic in resort country and pay deficits from taxation. Several years ago it turned to the motor bus and now, with more than 300 in operation, the deficit has been converted into a surplus. Carrying of mail could be done free of charge. Extension is now under contemplation, as well as switching from solid to pneumatic tires.

### Views of Government on Highway Transport Regulation

ANNOUNCEMENT that the federal government contemplates the regulation of traffic on federal-aid roads has given rise to the fear in uninformed quarters that this may result in drastic and troublesome conditions which will affect the use of highways. Just the opposite is the case. Federal officials are inclined toward more liberal regulations than are now being enforced in many states. It is believed that highway transport is suffering from unscientific regulation.

Federal officials are keenly alive to the fact that the country is suffering severely from lack of transportation. Their entire inclination is to encourage the maximum use of highways. Before attempting to draft regulations, however, very careful studies are being made, largely with the idea of making regulations which are just as liberal as can be devised.

# Good Roads the Key to West Virginia Bus Operation

Light Vehicles Used Pending Growth of Business and Improved Highways  
—Many Lines Act as Feeders to Steam Railroads—Highway Construction  
and Motor Vehicle Regulation Centralized in State Road Commission

**S**PEAK of bus operation to many people in West Virginia, and they will tell you, particularly if the subject is brought up in the winter or spring months, "There ain't no such thing." As a matter of fact a survey made last month by an editor of BUS TRANSPORTATION who visited most of the bus centers in the state shows that some seventy lines are supplying regular service over 892 miles of highway. A few of the lines, it is true, have to quit during the bad months of the year, but even they operate when the roads would be considered impassable by the ordinary motorist. Some of the lines, it was found, use horse-drawn vehicles when the going is impossible for their gasoline steeds, and on others, where Nature has furnished a liquid right-of-way, gasoline motor boats are pressed into service for part of the year.

But the future is bright, for the state has appropriated \$50,000,000 with which to build highways, and while only a small part of this has been spent, already its influence is felt, and scores of applications are being made to the State Road Commission by operators willing to discount the future and to supply present needs on what will some day be improved highways. A considerable mileage of good roads is now available, but this radiates as a rule from the large cities and towns, and there are many dirt-road gaps yet to be filled between points that would justify bus operation on a fair-sized scale. The work is being carried on, however, as rapidly as appropriations are made available and can be expended.

## WHERE THE BUSES RUN

The maps and table accompanying this article show the present situation in West Virginia. In the north, Wheeling, Morgantown and Clarksburg are the main centers of bus activity. Bluefield on the southern border has a number of lines. In

the western part, Huntington leads, with lines working up and down the Ohio River and inland or eastward along the road toward Charleston, the state capital. Here also there is considerable activity, and Charleston is practically the only place in the state where local bus service is given. Negotiations are under way, however, for a local line in Wheeling, and

mills and factories scattered all over the state, and last and perhaps most important at present, to make railroad connections. At all the important stations on the Baltimore & Ohio, Chesapeake & Ohio, Norfolk & Western, and other passenger-carrying railroads, the buses connect with the trains. The result is a large amount of operation between



*Types of buses operated over West Virginia mountains  
shown in front of Huntington waiting room*

the route proposed for this is shown on one of the maps.

Most of the cities are so small, both in area and population, that purely local service is not in demand. Of the million and a half population, about 75 per cent are classed by the census as living in towns of less than 2,500 people. The largest city, Wheeling, has 56,000 people, and then come Huntington with 50,000 and Charleston with 40,000 people. In all there are only ten cities of more than 10,000 population.

The business is like that in most other states. Passengers are carried to do business in the trading centers, to work in the mines and

the hours of 1 and 5 in the morning, when bus operators in other states are getting a well-earned rest, or at least are not making scheduled runs.

## LIGHT EQUIPMENT THE RULE

Touring cars are used exclusively on most of the West Virginia lines, although there are in service a considerable number of medium-duty buses, of from twelve to twenty passenger capacity. On many lines, however, because of the poor roads and light traffic, the five to seven passenger touring car is the most practicable equipment. As these conditions improve many operators plan to buy buses. These will probably be of the

medium-duty type, with standard 53-in. gage, plenty of power and with good riding qualities. West Virginia roads are hilly, full of twists and turns, and in many cases narrow. The conventional body construction, with center aisle and standard 36-in. seats on either side, is seldom used. Preferred is a modified form with a row of cross seats on one side and a single longitudinal seat on the other.

#### FARE COLLECTION METHODS

Most of the lines operate on the pay-leave system, with the driver's pocket serving as the farebox. Some of the larger operators use tickets. On the Ultimate line in Wheeling a strip ticket is sold by the drivers, which entitles the passenger to a 5-cent ride for 3½ cents. The trolley

on the same route gets 8 cents cash fare, or 5 cents for a ticket sold in lots of ten.

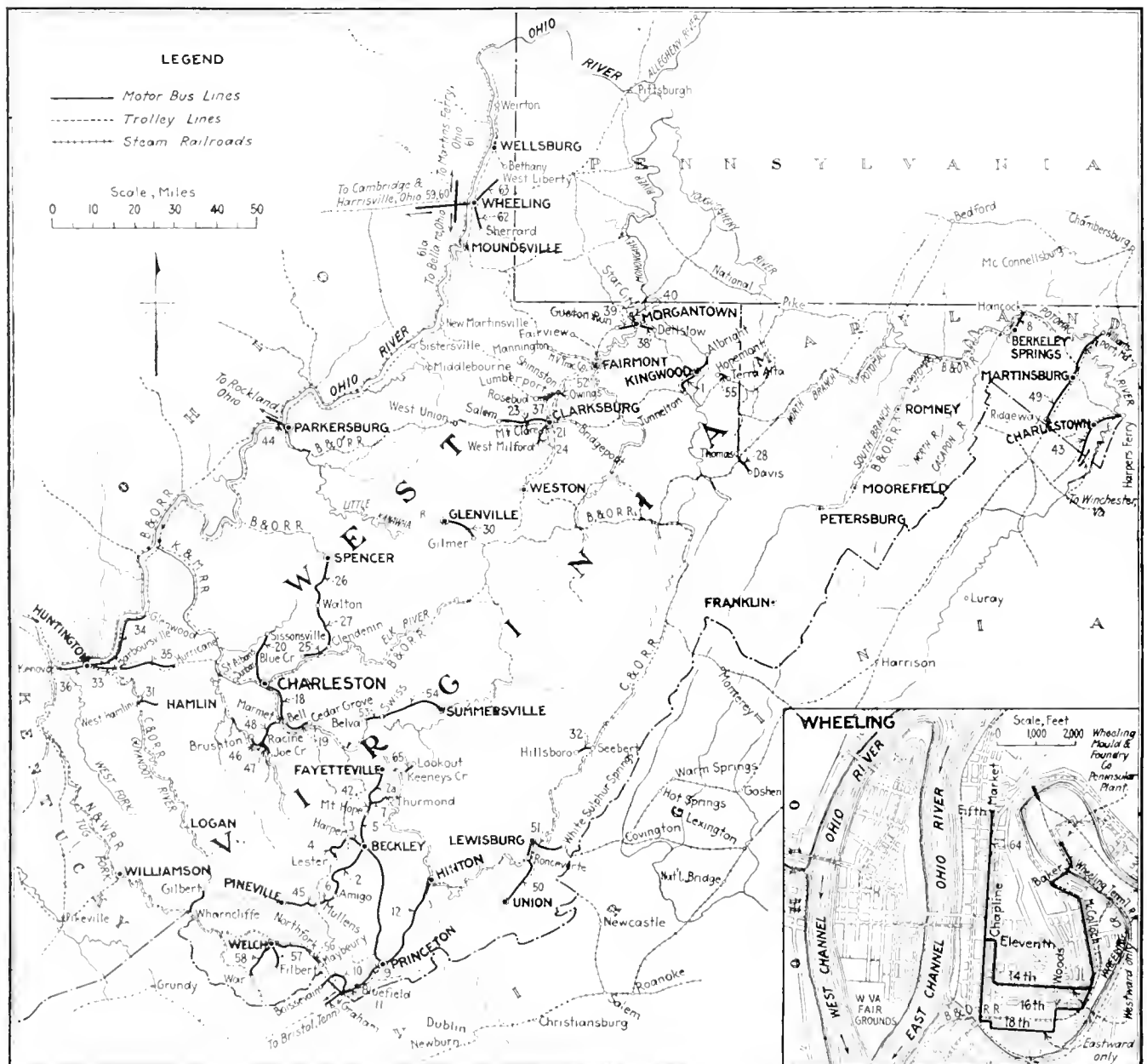
The rate per mile varies considerably, as is to be expected under the conditions. On some lines it is as high as 25 cents, but a large number are found to charge around 10 cents per mile. Where bus routes parallel the railroad the rates are about the same. There is little competition between the buses and the city electric lines. The local bus routes in Charleston are laid out to serve parts of the city not reached by the trolleys. Operating costs in the state are high, but with better roads

operators are looking forward to the use of improved equipment which can be operated profitably at lower fares. One operator on a 55-mile route in the southern part of the state, now charging a \$5 fare for touring-car service, is ready to reduce it to \$4 as soon as the present road, dirt for half the way, is improved.

#### ON THE HIGHWAYS

In 1921 West Virginia passed a road law that created a commission in charge of highway matters, construction and maintenance. This commission also has charge of licensing of all motor vehicles, and of bus regulation. The total mileage of public roads in the state is given as 32,000, of which 4,675 miles are so-called inter-county roads, connecting county seats, commercial centers and

*In West Virginia the bus is an important feeder to the steam railroads. Notice also the inter-state operation.*



agricultural sections. After the passage of the 1921 law, 3,400 miles of 4,675 mentioned were designated as state routes and form the system now being improved by the State Road Commission. This, of course, leaves many thousands of miles of district roads, which are under the supervision of the various counties. Other highway and population statistics are given in an accompanying table.

Of surfaced or paved highways the state has about 1,000 miles, according to the latest report available. The 1922 program contemplated the construction of 125 miles of hard surfaced road, that is, of water bound or bituminous macadam, or of asphalt concrete. In the latest construction the roads are graded 24 or 28 ft. wide, with a hard surface of 16 or 18 ft., respectively. Grades in general are kept down to 10 per cent, and the 8 per cent maximum allowed for federal-aid highways is adhered to whenever possible.

#### MOTOR VEHICLE LEGISLATION

All the regulations relating to motor vehicles in West Virginia are incorporated in a Good Roads Law, passed by the Legislature in 1921. Under this the Good Roads Commission collects all motor vehicle license fees, regulates highway traffic, and grants permits for the operation of motor vehicles, carrying passengers or freight, on fixed schedules between regular terminals.

The license fee for vehicles operated in bus service is 50 cents per horsepower (based on A. L. A. M. formula) and 50 cents per hundred pounds weight of vehicle and load. The load weight is the adult seating capacity multiplied by 125. (For private passenger cars the rate is 30 cents on both horsepower and weight of vehicle and load.) In addition each driver, whether owner or hired operator, must pay a yearly chauffeur's fee of \$3.

Motor vehicles must not be used in bus service, according to the law, unless a permit is secured from the proper authority. For operation wholly within cities or incorporated towns the authority is the city or town council or corresponding body. In other cases the authority is the State Road Commission, which consequently grants most of the permits in West Virginia. The purpose of this part of the law, the commission has indicated, is to insure reliable and dependable service to the



Two types of bodies used on White chassis by Huntington-Horner Co., Inc.

public at reasonable rates. The commission has followed the policy of refusing permits where adequate service, by railroad or other means, is already available. Applicants for permits are required to present their case in a public hearing, a notice of which must appear at least twice in the local county newspapers. In considering applications the commission requires evidence of good moral character and financial standing; the applicant must show conclusively:

1. That a public necessity exists for the service.
2. Whether the proposed route or any part of it is a part of or closely parallels a public utility giving similar service.
3. Approximate number of passengers to be carried.

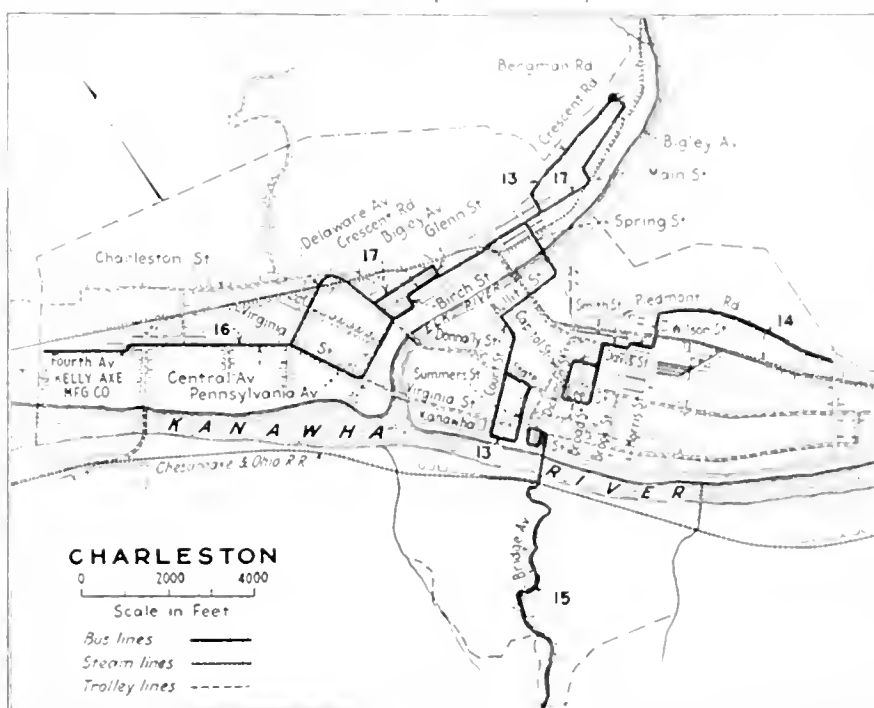
4. Number of vehicles proposed to be operated, kind, make, capacity and physical condition. That they conform with rules and regulation of the State Road Commission.

5. Proposed schedule.

6. Proposed rates and that they are reasonable and fair to the public and sufficient adequately to maintain continuous service.

The law requires that an approved bond must be filed by applicants to whom permits are granted. This may be a personal or a surety bond; the amount is \$2,500 for one vehicle, and \$500 for each additional vehicle up to a maximum of \$5,000. The purpose of the bond is to secure faithful performance of the Good Roads Law and of the rules prescribed by the commission. It is not

These five local lines, using touring cars owned by individuals, are operated in the West Virginia state capital



supposed to provide indemnities in case of accident, for which the general law provides ample relief.

Permits are usually granted for the calendar year, and renewed on Jan. 1 unless there is good cause for a refusal. At present the West Virginia lines are operating on temporary permits covering the first four months of 1923, these having been issued because of important changes proposed in the present law.

There are now before the state legislature two bills relating to bus

operation. The first (Senate No. 208) leaves the amount of taxes and license fees unchanged, but takes away from the Road Commission the work of collecting them. This work would be done by the clerks of the various county courts, as would also the granting of chauffeurs' licenses and of permits for the operation of bus lines. A new section is added requiring all vehicles, before passing railway grade crossings, to stop at a distance of not less than 10 nor more than 100 ft.

The second bill (House No. 368) is sponsored by the commission, and would require permits for both bus and taxicab service wherever located; if operation is wholly within cities or incorporated towns the consent of the local authorities must first be obtained. Another condition is that the permit or certificate of convenience must be obtained from the governing body before the operator can get his license or certificate of registration.

Under the proposed law the com-

## Bus Routes and Schedules Operated in State of West Virginia as of March 1, 1923

Map Key No.	Route	One-Way Distance (Miles)	No. of Vehicles	Unit Seating Capacity		One-Way Fare	Minimum Fare	Fare Basis	Rate per Mile (Cents)	Average No. of Round Trips per Day			Normal Outside Time		Running Time	Headway
				Buses	Touring Cars					M-F	Sat.	Sun.	A.M.	P.M.		
1	Albright to Tunnelton	15.0	3	15	...	\$1.00	\$0.10	D	6.67	4	4	*	6:10	8:30	1 1/2 hr.	Irregular
2	Beckley to Amigo (a)	19.0	1	15	...	1.75	.50	D	9.21	1	1	*	8:30	5:00	2 hr.	*
2a	Beckley to Fayetteville	25.0	2	18	...	1.25	.10	D	5.00	2	2	*	7:15	4:40	45 min.	Irregular
3	Beckley to Harper (b)	6.0	6	...	5-7	1.00	*	D	16.67	4	4	*	7:00	4:45	60 min.	4 hr.
4	Beckley to Lester	9.0	4	...	5-7	1.00	.25	D	11.11	3	3	*	7:00	6:00	1 1/2 hr.	Irregular
5	Beckley to Mount Hope	20.0	2	...	5-7	1.00	.25	D	5.00	*	*	*	7:00	8:00	2 1/2 hr.	Irregular
6	Beckley to Mullens	18.0	2	...	5-7	2.00	*	D	11.11	2	2	*	7:10	6:10	25 min.	Irregular
7	Beckley to Thurmond (2 operators)	20.0	9	...	7	2.00	.25	D	10.00	6	6	*	8:00	6:00	4 hr.	Irregular
8	Berkley Springs to Hancock (Mid.)	6.0	1	20	...	.35	.35	F	5.83	2	2	*	7:00	6:50	60 min.	Irregular
9	Bluefield to Beckley (2 operators)	55.0	2	...	5-7	5.00	.15	D	9.11	2	2	*	8:00	5:30	4 hr.	Irregular
10	Bluefield to Boissevain (Va.)	16.0	1	15	...	.65	.15	D	4.06	4	4	*	7:00	6:50	60 min.	Irregular
11	Bluefield to Bristol (Tenn.)	100.0	2	...	7	5.00	*	D	5.00	2	2	*	8:00	5:30	4 hr.	Irregular
12	Bluefield to Hinton via Princeton	47.0	2	...	7	5.00	.50	D	10.62	2	2	*	8:00	5:30	4 hr.	Irregular
13	Charleston—Local routes	...	50†	...	...	...	...	...	...	...	...	...	...	...	...	...
14	Crescent Road	2.2	...	...	7	.05	.05	F	2.27	...	...	...	...	...	...	...
15	Piedmont Road	1.8	...	...	7	.05	.05	F	2.78	...	...	...	...	...	...	...
16	South Side	1.5	...	...	7	.05	.05	F	3.33	...	...	...	...	...	...	...
17	Kelly Axe Factory	2.4	...	...	7	.05	.05	F	2.08	...	...	...	...	...	...	...
18	Bigley Avenue	2.0	...	...	7	.05	.05	F	2.00	...	...	...	...	...	...	...
19	Charleston to Bell	11.0	12	...	5-7	.50	.15	D	4.55	30	30	30	6:30	12:00	1 hr.	30 min.
20	Charleston to Cedar Grove via Dana	19.0	9	...	5	1.00	.15	D	5.26	8	8	*	6:00	1:30	1 1/2 hr.	2 hr.
21	Charleston to Sissonville (2 operators)	12.0	5	...	5-7	.50	.05	D	4.17	12	12	*	6:00	8:20	40 min.	60 min.
22	Charleston to Mt. Clare	6.0	2	...	5-7	.25	.25	F	4.17	4	4	*	8:10	5:20	25 min.	Irregular
23	Charleston to Norwood	2.0	1	11	...	.10	.10	F	5.00	16	22	16	12:00	8:00	20 min.	30 min.
24	Charleston to Salem	14.0	2	16	...	.50	.10	D	3.56	12	12	2	6:00	11:00	60 min.	3 hr.
25	Charleston to West Milford (c) (2 operators)	10.0	3	...	5-8	.75	.25	D	7.50	3	4	2	7:00	5:45	45 min.	Irregular
26	Clendenin to Blue Creek	8.0	2	...	5	.75	.10	D	9.38	1	1	*	8:15	9:30	45 min.	Irregular
27	Clendenin to Spencer	30.0	2	...	7	2.25	.10	D	7.50	2	2	2	7:30	5:00	2 hr.	Irregular
28	Clendenin to Walton	14.0	5	...	5	1.00	.10	D	7.14	2	2	*	7:00	6:30	1 1/2 hr.	Irregular
29	Davis to Thomas	3.0	3	15	5-7	.25	.25	F	8.33	12	12	12	8:10	11:00	20 min.	60 min.
30	Gilbert to Wharfedale	11.0	4	...	5	2.50	*	D	22.73	4	4	*	7:00	5:30	1 1/2 hr.	Irregular
31	Glenville to Gilmer	12.0	3	...	5	1.50	*	D	12.50	1	1	*	8:00	2:10	1 1/2 hr.	...
32	Hamlin to West Hamlin	6.0	3	...	5	.50	.50	F	8.33	4	4	2	7:00	6:17	45 min.	Irregular
33	Hillsboro to Seebert via Mill Point	3.0	1	12	...	.25	.25	F	8.33	2	2	*	9:00	6:00	...	Irregular
34	Huntington to Barboursville (2 operators)	12.0	2	12	...	.35	.25	D	2.92	9	9	9	6:55	6:35	40 min.	60 min.
35	Huntington to Glenwood	22.0	5	15	7	.50	.15	D	2.27	4	5	2	5:45	8:00	1 1/2 hr.	Irregular
36	Huntington to Hurricane via Barboursville	20.0	11	10-19	7	.60	.15	D	3.00	32	33	26	5:30	12:30	70 min.	30 min.
37	Huntington to Kenova	10.0	3	15	7	.50	*	D	5.00	5	3	3	5:10	11:30	30 min.	Irregular
38	Lumberport to Rosebud	4.0	2	...	5	1.00	.25	D	25.00	1	1	1	8:20	5:20	30 min.	...
39	Morgantown to Dellslow via Sabraton	5.0	3	16-20	5	.25	.05	D	5.00	25	25	20	5:30	12:30	30 min.	30-60 min.
40	Morgantown to Guston Run	6.0	5	14-18	5	.25	.05	D	4.17	27	27	*	5:50	12:00	30 min.	20 min.
41	Morgantown to Star City	3.0	4	16	5	.15	.15	F	5.00	18	18	15	5:30	11:30	20 min.	60 min.
42	Mt. Hope to Thurmond	8.0	2	...	7	1.00	.25	D	12.50	*	*	*	*	*	45 min.	*
43	Harpers Ferry to Winchester (Va.)	32.0	3	6	...	1.15	.25	D	3.60	2	2	2	9:00	7:00	1 1/2 hr.	...
44	Parkersburg to Rockland (Ohio) via Belpre	3.0	*	...	*	*	*	*	*	19	19	17	5:00	12:00	30 min.	60 min.
45	Pineville to Mullens	15.0	5	...	7	1.50	.50	F	10.00	6	6	6	6:00	6:00	60 min.	2 hr.
46	Racine to Brushton	5.0	1	...	5	1.25	.50	D	25.00	2	2	*	6:00	6:30	40 min.	Irregular
47	Racine to Joe Creek (Seth P. O.)	12.0	1	...	5	1.00	.25	D	8.33	1	1	*	6:15	8:05	45 min.	...
48	Racine to Marmet	9.0	1	...	5	2.00	.50	D	22.22	2	2	*	8:10	6:45	60 min.	Irregular
49	Ridgeway to Williamsport (Md.) via Martinsburg	25.0	1	16	...	1.00	*	D	4.00	2	2	*	10:00	5:45	1 1/2 hr.	Irregular
50	Ronceverte to Union (c)	...	1	...	7	...	...	...	...	...	...	...	...	...	...	...
51	Ronceverte to White Sulphur Springs via Lewisburg	16.0	2	...	5-7	1.00	.25	D	6.25	4	4	0	7:45	6:10	45 min.	Irregular
52	Shinnston to Owings (4 operators)	3.0	4	...	5-7	.25	.10	D	8.33	64	64	64	6:15	10:45	20 min.	15 min.
53	Summersville to Belva	21.0	1	...	5	3.00	.50	D	14.29	1	1	*	8:00	3:20	*	...
54	Summersville to Swiss	15.0	2	...	5	2.50	.50	D	16.67	2	2	*	5:00	6:30	*	Irregular
55	Terra Alta to Hopewell	2.0	3	...	5	.25	.25	F	12.50	7	7	7	8:20	8:20	10 min.	Irregular
56	Welch to Mayheury via Northfork	22.0	3	16	...	.95	.15	D	4.21	7 1/2	9 1/2	9 1/2	7:00	11:00	2 hr.	2 hr.
57	Welch to Elbert	12.0	2	...	7	.65	.05	D	5.42	14	14	14	7:00	10:00	60 min.	30-60 min.
58	Welch to War	16.0	4	12	5	1.50	.25	D	9.38	4	4	1	5:45	7:40	85 min.	Irregular
59	Wheeling to Cambridge (Ohio)	50.0	8	12	...	2.00	.50	D	4.00	11	11	11	7:00	8:00	2 hr.	60 min.
60	Wheeling to Harrisville (Ohio)	15.0	1	16	...	.75	.50	D	5.00	1	1	1	9:00	6:00	1 1/2 hr.	...
61	Wheeling to Martins Ferry (Ohio)	4.8	16	16-24	...	.10	.05	D	2.13	75	75	65	5:40	1:05	25 min.	30 min.
61a	Wheeling to Bellaire (Ohio)	5.5	6	16-24	...	.15	.05	D	2.73	75	75	65	5:40	1:05	25 min.	30 min.
62	Wheeling to Sherrard	12.0	1	16	...	.25	*	D	2.08	4	5	3	5:50	7:15	45 min.	4 hr.
63	Wheeling to West Liberty	10.0	1	...	...	.50	*	D	5.00	2	2	2	7:00	5:00	45 min.	Irregular
64	Wheeling—East End Line (c)	2.4	4	24	...	.05	.05	F	2.08	64	64	64	6:00	11:00	20 min.	15 min.
65	Keeney's Creek to Lookout via Winona	4.0	4	...	5	2.00	.25	D	50.00	4	4	*	7:00	7:45	65 min.	Irregular

\* Information not available. † Approximately fifty touring cars, classed by the city as jitneys, furnish service over routes specified.

(a) Operates over a dirt-road which necessitates stopping during spring and winter.

(b) Uses horse-drawn vehicles in winter.

(c) Operates over a dirt-road. Service only rendered when road permits.

(d) Makes two extra trips between 1.00 and 5.00 a.m., at double fare, to connect with C. & O. and B. & O. trains at Kenova.

(e) Application pending before State Road Commission.

(f) Application pending—now before Wheeling City Council.



mission would be given power to issue bus permits for periods up to ten years, when justified by the service proposed and the capital to be invested. A bond is required, of an amount deemed necessary by the commission to protect adequately the public interest, and this would also cover injury to person and property. If the financial responsibility of the applicant is less than \$5,000 each vehicle must carry a liability insurance bond of \$1,000 to guarantee performance and cover damage claims.

Taxicabs would pay a flat rate of \$100 a year for the certificate of registration and the corresponding registration plates, and a levy on the Maryland seat-mile basis is specified for passenger-carrying vehicles working between fixed terminals. For vehicles weighing less than 3,000 lb. the rate is one-twentieth of a cent per seat-mile per year; then up to 7,000 lb. it is one-fifteenth of a cent; and for vehicles weighing more than 7,000 lb. the fee would be one-sixth of a cent per seat-mile per year. The seat-miles are obtained by multiplying the number of passenger seats in the vehicle by the total number of miles to be traveled during the year.

Under the present law the maximum gross weight, including load, of vehicles allowed on the state highways is 22,000 lb., with a limit of 600 lb. per inch of tire width. The proposed law would limit the gross weight to 10,500 lb. and the weight on any one wheel to 300 lb. per inch of tire width. Heavier vehicles require a special permit and bond.

As a means of enforcing the new law the commission is empowered to require the evidence of witnesses and the production of documentary evidence at its designated hearings, and failure to obey such summons can be made punishable for contempt of court. Special officers appointed by the commission are given the same authority as duly qualified constables to make arrests for violations of the Good Roads Law, and must execute a bond of not less than \$2,000 for faithful performance of their duty.

In closing this article mention should be made of the local ordinances relating to the bus. The state law gives cities or incorporated towns the authority to grant permits for operation within their borders. They also may regulate the type of equipment thus used, and also the parking of vehicles and progress of traffic. The tendency has been to follow the state laws and regula-

#### West Virginia Transportation Facts

Population	146,794
Area square miles	
Land	24,119
Water	148
City population	
50,000 to 100,000	1
25,000 to 50,000	3
5,000 to 25,000	12
	16
Largest city, Wheeling, population	9,298
Miles of highways outside towns and cities	32,000
Miles of bus routes	892
Number of bus routes	66
Number vehicles in bus service	234
Open or closed buses	71
Touring cars	183
Bus miles per day, estimated	13,100
Mileage electric railways	624
Mileage of steam railroads	3,994

tions, with certain minor changes. The bond is required to cover claims for damages for injury to persons or property, rather than performance. In Clarksburg, where there are at present no local lines, the bond is \$2,500 for each vehicle carrying passengers for hire, and it covers violation of the city traffic ordinance, as well as claims for damages. Charleston requires a bond of \$2,500 for the first motor vehicle, and \$500 for each additional one, with a maximum of \$5,000 from any one applicant. Seating capacity fixes the amount in Wheeling, the bond being \$2,500 for a five-passenger vehicle, and \$500 for

each additional seat, up to a maximum of \$5,000 for any one vehicle. The Wheeling bus ordinance provides for an inspection of vehicles proposed to be used by a mechanic designated by the City Council, the expense of which must be borne by the applicant. Another Wheeling requirement, as expressed in the ordinance, is that vehicles must operate over their regular routes for not less than twelve consecutive hours out of every twenty-four, with not more than two hours allowed for going to and from meals.

So far no special license fee is charged for city or intercity operation by West Virginia cities. It is held that the state law does not permit charging for the privilege of operating. In Wheeling, however, by agreement with the various lines with terminals there, from \$25 to \$75 per bus per year is collected, the amount varying with the mileage covered by each vehicle. To get into Wheeling from Ohio, operators must pass two toll bridges, and the toll charges form a considerable item in their operating expenses; one large bus line in 1922 paid some \$20,000, it is understood, for the use of bridges across the Ohio River.

## Makes Gallant Fight Against Snow



During one of the worst winters in the history of northwestern Pennsylvania the Bradford-Smithport line has kept its lines open with but one interruption.

As this line, which is operated by C. H. Latham, Inc., Bradford, Pa., follows a route mainly through the mountains, difficult to keep open even during ordinary winters, the feat is even more remarkable.

The manner in which this company has fought the snow blockades is best shown by the accompanying illustration. Two Drexler buses are coupled together and push a heavy snowplow before them. This work has been undertaken by the bus company with practically no outside assistance and has cost the line a considerable sum to keep the route clear not alone for its own use but also for the other traffic.

# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, March, 1923

## *Study Your Fare Collection Methods*

**R**EPEATEDLY BUS TRANSPORTATION has been requested to help solve the problem of collecting fares on various motor bus routes.

The bus operator today, whether running on an urban flat-fare line or on an intercity route that has a multiplicity of fares, has a collection problem confronting him that does not differ materially from that on many electric railway systems, even though all the work must be performed by one man—the bus driver. With the flat-fare system, however, the problem is not as acute as with the distance basis tariff. The only real solution so far worked out for the latter is the meter so largely used by the taxicabs throughout the country. This meter, which can be set in motion at the will of the taxi operator, as he picks up a passenger, registers the distance traveled directly in the rate of fare charged.

If some similar system, equally simple in operation, could be devised for the collection of intercity zone bus fares many of the difficulties in the problem would be immediately solved, but unfortunately there is no such device that can be used. Today, the work done mechanically by the taximeter must be performed by the bus driver, and it is here that the human equation enters with its likelihood of errors and lack of ability of the driver always to do the right thing.

One of the fundamentals for the collection of fares on any transportation system is that it be done as far as possible by mechanical means. This not only relieves the bus driver from excessive responsibility and the necessity of making elaborate reports for the purpose of determining the riding characteristics of the passengers carried, but most of all facilitates operation. Really there are only two things that it should be necessary for the driver to do in addition to seeing that passengers pay the correct fare for the distance traveled; namely, keep a record of the number of passengers carried and identify the boarding point and direction of travel of each passenger. There are a number of ways in which this can easily be done. The simplicity with which the end is accomplished, however, depends entirely on the nicety of accuracy with which the company desires to handle its affairs.

In this issue of BUS TRANSPORTATION are printed

articles which deal with three different means of collecting distance fares, each of which has its own merits. Bus operators are urged to give the question of fare collection serious consideration in order to assure themselves that they are receiving their full share of the revenue collected on their buses.

—[ EDITORIAL ]—

## *A Standardized Bus Accounting System Needed*

**I**N THE motor bus industry, especially among individuals and independent companies, there is a shameful lack of attention to accounting or bookkeeping. Few operators are able to tell accurately the amount of earnings from different sources or even in bulk for a given period, and are entirely unable to separate the major expenses of operation item by item.

In fact, many operators are cognizant only of the items "gasoline and oil" and "driver's wages." The industry is growing and growing fast, and it behooves the operators to know what it costs them in detail to conduct their operations. Unless the operators get together and formulate an accounting plan applicable alike to large and small undertakings, they will find that the regulatory bodies will prescribe a system of accounting that will perhaps be more arduous to maintain than is necessary. A definite knowledge of operating costs is the key to the whole study of operating economies.

Products low in first cost are not always the cheapest in transportation service, for the life of the product or material is the all-important factor. One of the first items essential to an intelligent comparative analysis of costs is the number of bus-miles run, both as a total and by individual vehicles. Tire records, for instance, must be kept on a mileage basis, likewise the records of gasoline and oil consumption. Some operators have given this question of accounting considerable attention and can furnish statistics of performances which have proved extremely beneficial when ordering new types of equipment. All operators should, however, emulate the example thus set for them, adjusting the system which they follow to their individual needs. While it is true that expense is involved in the keeping of records, it is for the good of the operator and the industry that the application of uniform accounting methods is urged.

—[ EDITORIAL ]—

## *What Organization Has Done for Bus Operation in Chicago*

**S**INCE last October, when John A. Hertz, Charles McCulloch and their associates took over the interests of the Lake Shore Bus Company, including among other things the Chicago Motor Bus Company, and put John A. Ritchie at its head as president and George A. Green as vice-president, many changes in operating policies have taken place. Some of these are now becoming apparent to the layman, who daily uses this bus line to get to and from his place of business or who rides atop because of his desire to take the air.

Strange as it may seem, the open-top double-

decked bus seems to be more popular in Chicago in winter than in other American cities where this type of vehicle is operated. But why? is a natural inquiry. The only reason advanced that throws any light on this phenomenon of operation is that Chicagoans are more accustomed to the open air and do not feel the cold as do the people in other cities where the open-top double deckers are operated.

And how the people do ride the buses. With a 40 per cent increase in service for last December over the previous year traffic handled increased 50 per cent. January with its new schedules in full force, calling for many new turn-back points both in the morning and evening rush hours, has materially improved riding facilities and traffic for the month has shown a material increase over the previous year as well as a gain over the previous month.

There is no doubt but that the new management, with its intensified enthusiasm to make Chicago bus operation the finest in the world, is fast making friends and is steadily building up new traffic, which will, when the year is over, show a very material gain in the number of passengers handled, not only in total but on a bus-mile or seat-mile basis as well.

All this is said with full appreciation in mind of the work of the former management, for with little or no working capital it was able to build up the nucleus of what promises soon to be the greatest bus system in the country.

[ EDITORIAL ]

### *Closer Co-operation Between National and State Associations an Aid to Bus Industry*

**A**S WAS anticipated, it has not taken some of the more progressive bus owners and officials of incorporated bus companies long to see the value in associations. One needs only to glance at the list of organizations shown on page 146 of this issue of BUS TRANSPORTATION to see how the number of state bus associations is increasing.

Only last month did the Auto Bus Association of New York State affiliate with the National Motor Transport Association. The plan whereby the state association becomes actively associated with the national organization merits consideration by other state associations. First of all, membership in the state association is to carry membership in the national association as well. With the dues of the associations on the same basis the national association agrees to divide on an equal basis. This plan will provide funds for further enlarging the national organization through a more active membership campaign. In the meantime, the plan provides a mouthpiece in the state on all legislative matters affecting the motor bus industry. With a half dozen state bus organizations allied in a similar manner there might be a chance of securing some uniformity in regulatory and tax laws in the various states, instead of each successive state attempting to find some new way in which to levy on

the motor bus industry through general automobile tax laws. As it is now the automobile industry pays its fair share of taxes. Perhaps the taxes are not equitably divided according to the various types and kinds of automobiles, but that is a question that can be studied by all of the automobile and bus associations in joint conference.



## Letters to the Editor

The readers forum. Comments requested on pertinent subjects.

### Three Years of Bus Operation

ALBRIGHT, W. VA., Feb. 1, 1923

To the Editor:

We appreciate BUS TRANSPORTATION. All our boys seem anxious to receive the new number. The informant, E. E. Watson, started this line in 1919, making two round trips a day, using a Ford one-ton truck. In the fall of 1919 I bought a White 1-ton chassis with a McKay body. This has been in almost daily service since we bought it. Later we bought two Reo Speedwagons with the same make of body.

I well remember how hard it was in the year 1919 to get a bus body for the White trucks, as there were only a few building bodies at that time. Perhaps there were more than we knew about for there was no way for the builder and the buyer to get in touch with each other. BUS TRANSPORTATION now solves this problem.

We are watching with great interest the improvements being made by the different manufacturers, both in chassis and bodies, for some of these days we are going to be in the market for new equipment. And when we buy we want buses that won't jar the false teeth out of our patrons, so they must be easy riding and with plenty of power to pull these West Virginia hills that you have all heard about if you haven't had the pleasure to see.

When we first started we had to collect 8 per cent war tax on all fares over 42 cents. I looked everywhere I knew of for a device that would give us this information and the nearest to what we wanted was a small cash register. We bought two National cash registers that print all fares on a strip of paper which is turned in at the end of the day by the drivers. We are watching for something to come out that we think is better.

In 1921 I incorporated under the laws of the state, selling half the stock to good people along the route, which has proved very satisfactory. One object I had in incorporating was to protect myself and the other stockholders in case of an accident. However, in the three and one-half years we have been operating we haven't had a cent to pay. Unless the insurance companies reduce the rates on that kind of insurance we will take the risk ourselves.

E. E. WATSON, President,  
Preston County Bus & Garage Company, Inc.



# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Dual Wheel Has Single Air Valve

THE wheel shown in the drawing is furnished especially for bus work by the Indestructible Wheel Company, Lebanon, Ind. It takes two 34 x 5-in. or two 36 x 6-in. tires, using standard rim bases and standard valve stems. The stems may be connected with a special valve, which allows the pressure in both tires to be equalized. Tires can then be inflated from the outside through one nozzle for the two tires. The inflating valve is made by A. Schrader's Son, Inc., Brooklyn, N. Y. With this valve arrangement should one tire blow out or become punctured, both tires would be deflated. This would serve as a signal to the driver that he was carrying the load on one tire. In case of such trouble the inflating valve is

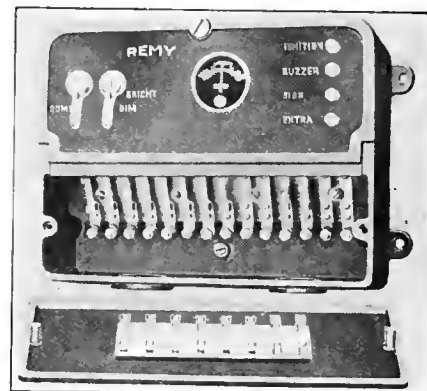
detached and a new spare installed, or the other tire inflated from air bottle or pump, and the trip completed. The equalizing valve is not essential, however, as the wheel can be used just as well without it. The dual wheel is made to fit standard axle hubs, so that special hub equipment is unnecessary. The company also makes disk wheels for single tires, to fit standard axle hubs.

## Bus Generator and Switch Box

THE Remy Electric Company, Anderson, Ind., is making a line of equipment consisting of a heavy-duty generator and a switchbox to serve all the bus wiring.

The generator, known as model 971-A, is of the third-brush regulated type, equipped with Remy thermo-

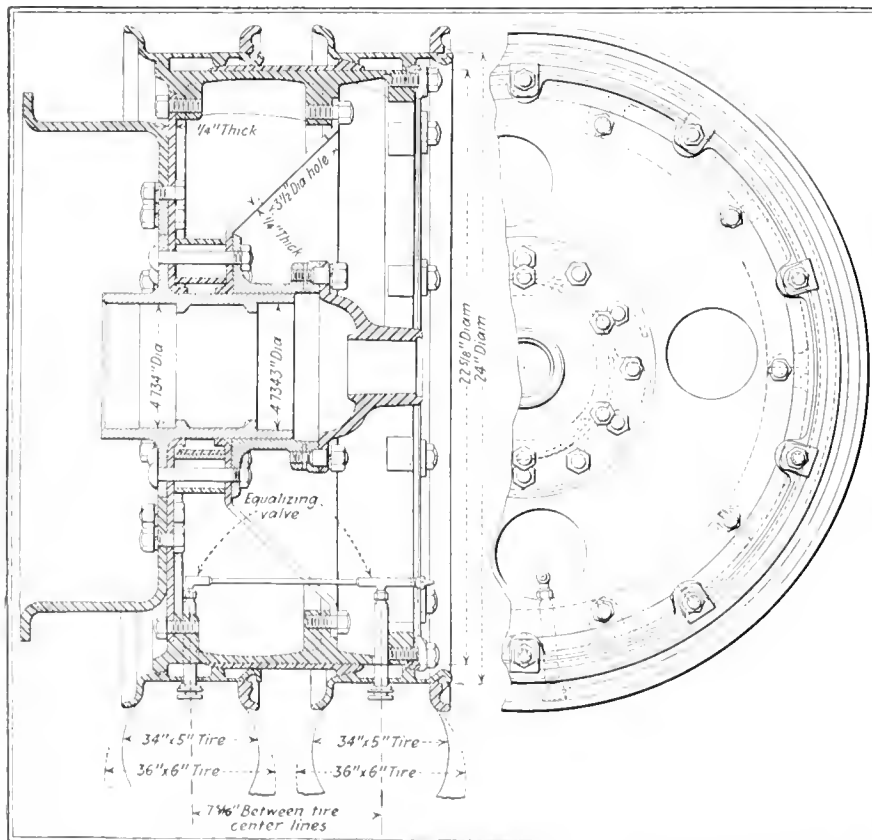
static control. The maximum output is 40 volts at 1,000 r.p.m. Cut in occurs at 400 r.p.m., and 20 amp. can be generated at 600 r.p.m. This output, of course, is too great to be used for charging any normal sized bat-



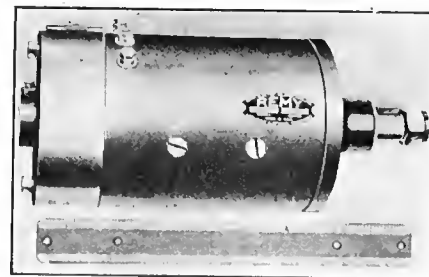
*Remy switch box, where practically all bus wiring is concentrated. Cover removed to show fuse blocks and terminals.*

tery, so that when the lights inside the bus body are turned on, a resistance is automatically shunted out of the generator field circuit; thus the field strength is increased, with a consequent rise in the generator output.

On account of the severe service encountered by buses the Remy company recommends conductors of liberal size, both for charging capacity and for mechanical strength. Terminals should be extra heavy gage and connections carefully soldered. The main leads in the generator circuit and to the lights should be No. 10 extra-flexible, rubber-covered,



*Indestructible steel disk wheel for dual pneumatic tires, brake drum attached*



*Model 971-A Remy generator designed for bus service and for mounting on power take-off pad of transmission.*

double-braided wire, while connections to step, pilot and stop lights should be No. 14 flexible conductor, covered with rustproof flexible armor.

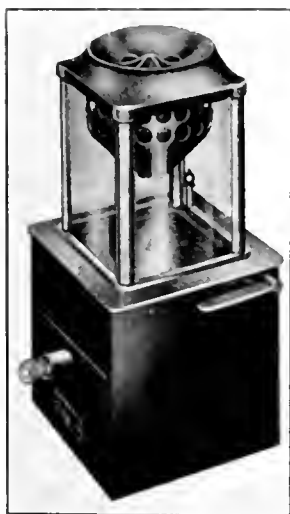
Because of the unusual number of connections in bus work, there has been difficulty in securing suitable junction boxes, fuse panels and switches. All these are centralized

in a single Remy unit designed for use with the Model 971-A generator.

The model 480-A switch box consists of an aluminum box, 5 x 9 x 12, in size approximately, on the face of which are two panels. On the upper panel, which is hinged, are the reverse current cut-outs, ammeter, and all switches of the electrical system, except the starting switch. Back of the lower panel, which is held in place by two thumb nuts, is a junction and fuse block with terminals for various connections. On the back of the panel are held a number of spare fuses. The use of this box, it is said, provides plainly marked terminals, individual fuses for each circuit, and a simple method of connecting the circuits to the right terminals. It may be mounted on the side of the body or over the dash, as preferred.

### Fare Box for Motor Buses

THE MODEL No. 101A fare box, put out by the Ohmer Fare Register Company, Dayton, Ohio, is intended particularly for motor bus service. This box is shown in the accompanying illustration. It weighs only 10 lb., the height is

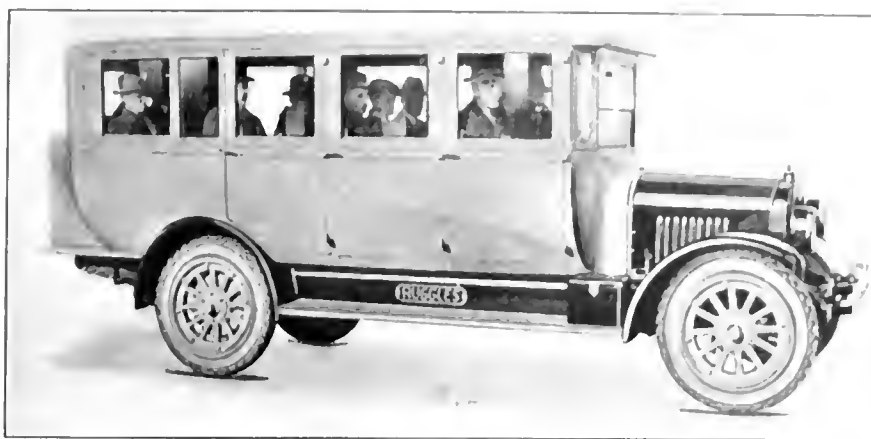


*Light-weight fare box*

12½ in. and width and length each 6 in. The plate glass is ⅜ in. thick.

Security against unauthorized interference is gained by a telltale of the gravity type which drops down and stays out of position if the box is turned upside down. The cash drawer is fitted with a Yale pin tumbler lock.

The box can be furnished either with a hanger for 1-in. pipe, or with a bracket for attaching to a flat surface.



*Sedan-type body seats sixteen passengers on Model AR Ruggles chassis*

### Chanticleer Motor Coach Announced

RUGGLES Motor Truck Company, Saginaw, Mich., and London, Ont., Canada, announces a new motor coach called the Chanticleer, and playing on the name the makers use as a slogan, "Cock o' the Road." The Chanticleer seats sixteen passengers, including the driver. There are three full-length seats and two short seats divided by an aisle. All passengers sit facing forward. Access to the coach is secured by three doors for passengers and a separate door for the driver.

The seat cushions and backs are upholstered with imitation gray Spanish leather. The exterior above the body line, and the interior, including the roof, are trimmed in the same material as the seats.

The body is mounted low and Stabilizers are used to insure roadability. The Ruggles 20-AR chassis gives 34 hp., ample to handle the load. This chassis has a 138-in. wheelbase, and 178 in. of ten-leaf springs.

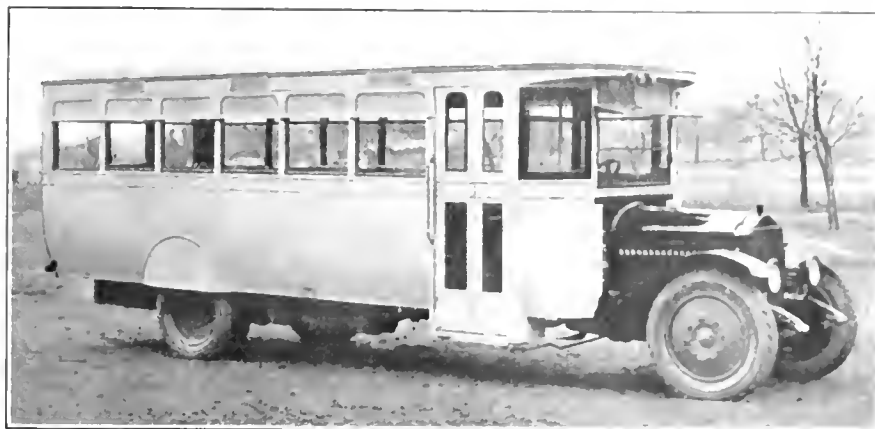
Built into the body is a compartment at the rear for bags and suit

cases. This has a small electric light for night loading. Adjustable side windows are frameless, and set in felt channel. The interior is kept comfortable by a forced air exhaust heater. Standard equipment includes all lamps, spring covers, bumper, motometer and tire carrier.

### Round Front Corners Feature Twenty-five Passenger Body

THE Hoover Body Company, York, Pa., has now in production a twenty-five-passenger body of the type shown in the photograph. This has the conventional cross seats, with longitudinal seats over the rear wheel housings. White ash and white oak framing is covered with plymethyl aluminum molding being used. The roof is aluminum, riveted to wood-metal carlines. The rounded corners on the front give unusual visibility to the driver. On the rear is placed a solid ash bumper faced with heavy steel; emergency door is also at the rear end.

The front door, which is operated from the driver's seat, is 29 in. wide.

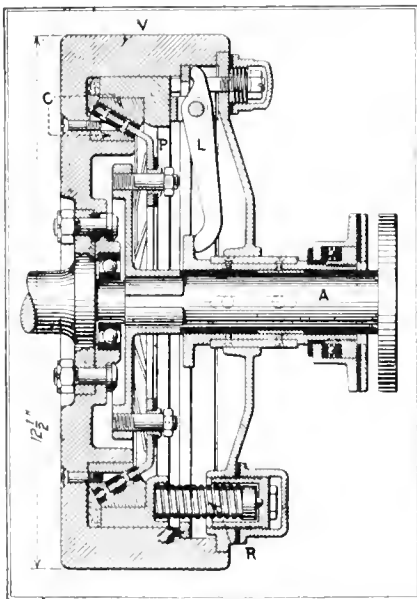


*Hoover twenty-five-passenger body mounted on White bus chassis*

Inside the floor is covered with slats and the seats with rattan. The metal window sash is said to eliminate noise from vibration. All windows are fitted with street car type curtains. Equipment also includes heaters and buzzers, dome lights, ventilators, sign panels, and rear view mirror.

### Experimental Clutch for Paris Buses

THE research department of the Unified Transportation System in Paris (le Société des Transports de en Comun de la Région Parisienne) has developed a bus clutch of a new type. It has been in use on five new buses since last July and has given satisfaction. The principles of this clutch are shown in the accompanying illustration.



*This new cone-type clutch has been tried out on the buses in Paris. Meaning of letters explained in the article.*

tion. It was designed to be lighter and less costly than the multiple-disk clutch generally used, and to combine so far as possible the advantages of that type and the plate type of clutch.

Referring to the cross-section, it will be noted that the clutch consists of an outer shell, *V*, carrying two renewable contact rings of steel, *C*. One of these is fastened tight to the shell; the other is fastened inside a ring, which slides axially in the shell, *V*, under the control of levers, *L*, the latter being actuated through a sleeve sliding on a shaft, *A*, under the action of a fork and system of outside levers. The shell as described is carried on the end of the shaft shown at the left in the illustration.

The sliding cone is forced against the other by means of the springs *R*, which determine the maximum applicable force. The levers *L*, of course, oppose the action of the springs. Between the two cones, *C*, rotates the outer portion of a dished steel plate, *P*, shod with asbestos on both faces opposite the cones. The dished plate *P* is carried by a wheel firmly mounted near the end of the shaft *A*. Obviously when the cones are permitted by the levers *L* to be forced together by the springs *R*, they clamp firmly on the asbestos shod faces of the dished disk *P*, transmitting motion from one shaft to the other. On account of the inclination of the cone surfaces, which has been worked out carefully, the force applied through the levers *L* is multiplied to the maximum extent that is found to be economical, thus minimizing the axial force necessary to be applied. The end of the shaft *A* is carried in a ball bearing which forms an integral part of the shell *V*.

### Bus in Jersey Service

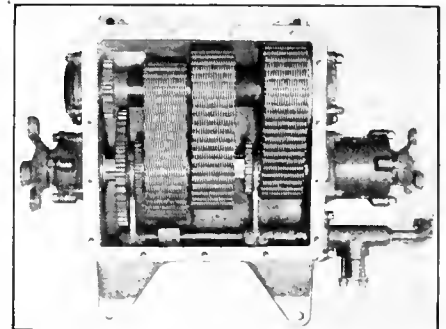
ONE of a group of buses now being delivered in northern New Jersey by the Motorbus Sales Corporation, Passaic, N. J., is shown in the accompanying illustration. A Pierce-Arrow bus chassis with 192-in. wheelbase is fitted with disk wheels, pneumatic tires, dual on rear, long springs, flexible outriggers on the frame to support the body, and with the sixteen-valve engine used on standard Pierce-Arrows.

The body, which is built by the Paterson Body Company, is of the Pullman car type, 19½ ft. long and 7½ ft. wide. Inside finish is mahogany and the bus has three ventilators on the roof. The body will seat twenty-five passengers comfortably

on cross seats, with two longitudinal seats over the wheel housing. The seats are covered with imitation leather. The equipment also includes dome lights, racks for advertising cards, and emergency door on the left-hand side at the rear.

### Chain-Type Transmission for Buses

THE design of transmission used extensively by large bus operators in London and New York is now being offered by the Morse Chain Company, Detroit, Mich. This transmission, which is shown in the photograph, is of the standard selective type, with three speeds forward.



*Morse three-speed chain-type transmission, cover removed.*

The feature is the use of silent chains instead of the conventional gears. The forward drive is by chain entirely, and the reverse through chain and gears.

In the standard construction the reverse speed has a ratio of 3.561 to 1, while the forward speeds are as follows: first, 3.397 to 1; second, 1.650 to 1; and third or direct, 1 to 1.

The transmission is about 30 in. long, from end to end of the shaft; bolt attaching centers are 13⅞x21½; and over-all height is about 14 in.

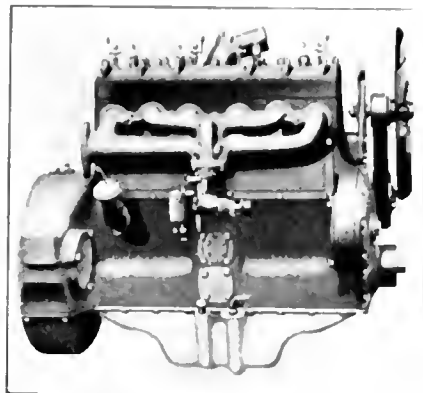


*Pierce-Arrow twenty-five-passenger bus fitted with Paterson Pullman-type body*



## Four Cylinder Engines for Bus Service

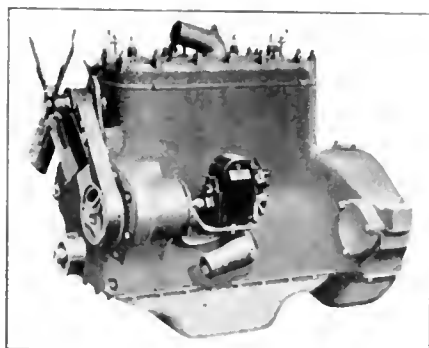
THE Waukesha Motor Company, Waukesha, Wis., announces two new models designed for heavy duty service. These are known as Model "Y," 4-in. bore by 5 1/2-in.



*Manifold side of Waukesha engine, designed for bus service.*

stroke, 264 cu.in. displacement and "YA," 3 1/2-in. bore by 5 1/2-in. stroke, 232 cu.in. displacement. They were shown for the first time at the New York and Chicago Automobile shows. Following is a brief description covering the general points of design.

Cylinder block and upper half of crankcase and flywheel housing is of gray iron, cast integral. Split line between crankcase and oil pan is 2 1/2 in. below center line of crankshaft. Lower half of flywheel housing is also a gray iron casting, and contains an oil pan, of the center-sump type, which can be dropped without removing the housing.



*Fan drive and magneto installation on Waukesha engine*

The separate cylinder head is held in place by twenty-one 1-in. studs. Lifting lugs on the sides make removal easy. The combustion chamber is a modified Ricardo type, for which maximum turbulence and higher

efficiency at all speeds is claimed.

Removable gray-iron cylinder sleeves are held at the bottom by a composition rubber gasket and at the top by a copper asbestos gasket. The pistons are aluminum alloy, with four piston rings above the piston boss. Snap rings at each end of the boss are used to hold the piston pin. Connecting rods are forged out of S.A.E. No. 1035 steel and are 1 1/4 in. center to center. Bearings at the lower end of rod are 2 1/2 in. in diameter and 2 in. wide, of bronze back and Fabrigr metal lining construction. These bearings have heat radiating flanges to carry off the heat from the bearings instead of through the bearing to the connecting rod.

The crankshaft is a carbon steel forging, the center and rear bearings being 2 1/2 in. in diameter by 2 1/2 in. in width, and the front bearing 2 1/2 in. in diameter by 2 in. in width. Thus the center and rear bushings are interchangeable, as are also the front main bearing and connecting-rod bushings. The camshaft, a steel forging, runs in three bronze bearings.

The full-pressure oiling system includes a gear oil pump fastened to the outside of the crank case, and driven by spiral gears from the camshaft. Separate pipes carry the oil to the front, center and rear main bearings and a relief valve, adjustable from the outside, regulates the pressure. Lubricating oil is strained twice, first through a large circular screen in the oil pan and secondly through a screen on the pressure side of the pump. The oil filler, which is also the breather, is on the valve side, as is the blade, the oil pump, the pressure strainer, the regulation valve and the oil drain plug. Thus the maintenance operations in the lubrication system can be carried out from the side and without getting under the engine.

Cooling is by thermosyphon, extra large water passages being provided. Here again the removable cylinder sleeves make it possible to clean thoroughly the jacket passages of core, sand and wires. The fan is driven by a 1 1/2 in. flat belt from the pulley mounted on the magneto drive-shaft.

The intake and exhaust manifolds are cast integral, a small hot spot being incorporated in the design to assist in the vaporization of the heavier fuels.

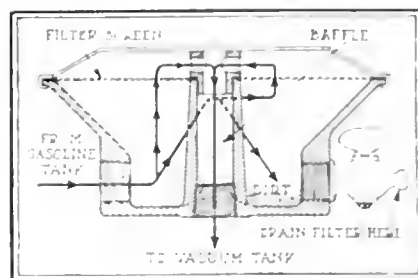
Three-point suspension is used, the front bearing being a 1 1/2-in. diameter trunnion turned on the gear

cover, the two other points are arms on the crankcase.

The starting motor, generator, carburetor, oil indicator and oil drain are all on the right hand or curb side of the engine. Thus it is unnecessary to stand out in the street to make minor adjustments and fill and drain the oil.

## Filter for Straining Gasoline

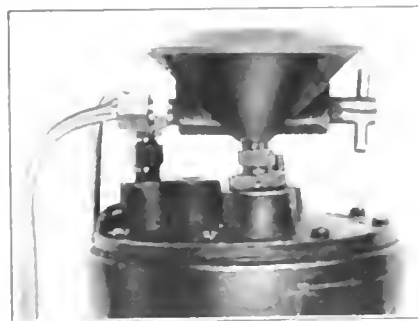
A FILTER made by the Standard Filter Company, Newark, N. J., and illustrated below, can be attached either to the vacuum tank or the carburetor. The filter includes a drain cock, shown connected at the right, through which any sediment can be removed. The cock is also



*Cross-section of Standard filter*

available to draw fuel for washing the hands, cleaning spark plugs, or priming the engines, and thus the sediment which collects is being constantly removed.

Fuel enters at the left of the filter, passes upward through a screen and down through a central tube, the dirt collecting underneath the screen, and is shaken loose and washed over the baffle wall into the sediment cham-



*Filter attached to top of vacuum tank.*

ber by the inflow of fuel. This feature, it is said, makes the screen continuously self-cleaning. The screen is made of non-corrosive metal woven into a fine triple mesh which gives the equivalent of a million holes in the 6 sq.in. of mesh area.

## Condensed Specifications of Motor Vehicles for Bus Service

Revised to March 3, 1923

Trade Name and Model	Main Dimensions				Engine Details				Transmission		Axles		Final Drive	Spring		Wheels		Tires																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest,  
to the bus transporta-  
tion industry.

## Transportation Keyed to Production \*

BY JULIUS H. BARNES

President Chamber of Commerce of the  
United States

**I**N THE RECORD of our railroads—always the chief channel of transportation—we find the following assurances of a great expansion:

1. The 141,599,000,000 ton-miles of 1900 had increased in 1920 to 413,675,000,000 ton-miles.

2. Passenger-miles had increased from 16,039,000,000 to 47,366,000,000.

3. The miles of track increased from 258,784 to 405,831.

Thus there is an increasing volume of earning traffic per mile of road, and this, of itself, would mean a natural economy in capital charges. On the other hand, railroads requiring labor and service must meet in their wage scales the constantly enlarging earning power, and also the competition for labor set by industries.

There is, of course, a constant effort to offset this trend of higher labor charge. This effort has been effective, in the relation of the dead-load to earning-load per car. Fifty years ago, and before specialized types of cars were generally developed and in use, the freight car of American railroads represented roughly 65 per cent of dead-

load and 35 per cent of earning-load. In 1922, a specialized type of car for ore and coal had reached a point of 20 per cent of dead-load and 80 per cent of earning-load capacity. It is manifest that the limits of further economy in improving this relation must be small indeed.

Again, any material expansion of our railroad service must require new and large additional capital investments. Some single-track lines and double-track lines are probably approaching the maximum load possible for the capacity of their present rails, and any substantial increase means at once new roadbeds and new rails.

As to terminal facilities, the maximum limit of service is even nearer to final exhaustion. James J. Hill said in 1907 that it would require the investment by American railroads of \$1,100,000,000 per year for five years to equip the railroad terminals of this country to meet adequately the traffic which was clearly in sight for those terminal facilities. No such sum has been invested in terminal improvements, even in the fifteen years which have since intervened.

The explanation of this lies largely in the supplementary service of the

motor truck. In some quarters this form of transport is treated as an active competitor of railroad service, while by other eyes it is looked upon as a great supplement and feeder to railroad traffic. Against the 2,600,000,000 actual tons lifted by all the railroads in 1921, we can place the estimate by the National Automobile Chamber of Commerce of the actual tons lifted that year by motor trucks at 1,400,000,000 tons, even though for shorter distances.

To co-ordinate these two forms of transportation requires a determination of the question of fair competition between a railroad, whose rates are regulated and controlled, and using a roadbed constructed by the investment of private capital, as against a shuttle of service like the motor truck, free of regulation and using a highway constructed and maintained at the public expense.

The motor truck, which is engaged in competitive freight service, should at least make a contribution in return for the construction and maintenance of the highway on which it operates. It will require careful analysis, aided by the best engineering opinion, to work out a proper charge.

On the other hand, the railroad rate structure in recent years has not been adequately reviewed. This structure has been blanketed up and blanketed down without attempt to approximate the varying degrees of an expanding labor charge into relative commodities.

Motor transport has an especial advantage in its flexibility and in ease of transfer of its surplus capacity from one route or one section to another, with the fluctuating needs of sectional industry. Moreover, it appeals to the American conception of reliance upon free competition, rather than government regulation.

And then we have the slowly developing avenues of water transport, with their possibility of quick expansion of facilities, once the water channels are

\*Abstract of address given Jan. 18, 1923, in New York before American Society of Civil Engineers

## Motor Bus Organizations

**NATIONAL MOTOR TRANSPORT ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; manager and secretary, E. E. Burritt, Fisk Building, 250 West Fifty-seventh Street, New York, N. Y.

**ARIZONA MOTOR TRANSPORTATION ASSOCIATION:** President, D. C. O'Neil, Douglas, Ariz.; secretary, E. A. Jones, 127 North Central Avenue, Phoenix, Ariz.

**MOTOR CARRIERS' ASSOCIATION:** President, W. E. Travis, president California Transit Company, San Francisco, Calif.; secretary, James G. Blaine, 1290 Bush Street, San Francisco, Calif.

**CONNECTICUT MOTOR STAGE ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; secretary, Edward J. Gidden, treasurer Congress Taxi Company, Danbury, Conn.

**MOTOR TRUCK ASSOCIATION OF FLORIDA:** President, W. T. Callahan, Miami; secretary-treasurer, D. E. McMann, 36 N. W. 1st St., Miami, Fla.

**GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION:** Presi-

dent, B. A. Harrison, Bainbridge, Ga.; secretary, W. M. Riley, Decatur, Ga.

**INDIANA MOTOR BUS OWNERS' ASSOCIATION:** President, H. E. Jahns, general manager Jahns' Bus Lines, La Porte, Ind.; treasurer, W. E. Rentschler, manager Indiana Motor Bus Company, Plymouth, Ind.

**IOWA MOTOR TRANSPORTATION ASSOCIATION:** President, J. Edgington, Des Moines, Iowa; secretary, E. P. Cronk, Des Moines, Iowa.

**MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION:** President, E. Foster, Moreton, president Moreton Trucking Company, Third and Howard Streets, Detroit, Mich.; secretary, H. H. Hardy, Lansing, Mich.

**MINNESOTA MOTOR BUS ASSOCIATION:** President, Rodney S. Dimmick, president Touring Car Bus Company, 29 Seventh Street, North Minneapolis, Minn.; secretary, Earl E. Jackson, Endicott Arcade, St. Paul, Minn.

**NEW JERSEY BUS TRANSPORTATION ASSOCIATION:** President, John Morning, 408 Warren Street, Newark, N. J.; secretary, Harry Fuesser, 79 Madison Street, Guttenberg, N. J.

**NEW JERSEY AUTO BUS ASSOCIATION:** President, George E. Seymour, Jr., 29 Clinton Street, Newark,

N. J.; secretary, George L. Cowan, 20 Clinton Street, Newark, N. J.

**AUTO BUS ASSOCIATION OF NEW YORK STATE:** President, Stanley Chatterton, White Rapid Transit Company, Lima, N. Y.; secretary and treasurer, James J. Dadd, president Rochester Bus Lines Advertising Corporation, 120 Vermont Avenue, Rochester, N. Y.

**OHIO MOTOR BUS ASSOCIATION:** President, R. E. McCollum, Ohio Motor Bus Company, Columbus, Ohio; secretary, C. J. Randall, 419 Majestic Building, Columbus, Ohio.

**AUTOMOTIVE CARRIERS' ASSOCIATION OF OREGON:** President, Max H. Clark, Portland, Ore.; secretary, J. L. S. Sneed, Portland, Ore.

**PENNSYLVANIA MOTOR BUS OWNERS' ASSOCIATION:** President, Frank Maritz, treasurer White Transit Company, Plymouth, Pa.; treasurer, W. J. Emerick, president Emerick Bus Lines, Bellefonte, Pa.

**WASHINGTON AUTO TRANSPORTATION ASSOCIATION:** President, A. C. Ellington, Des Moines Auto Company, Seattle, Wash.; secretary-manager, Erven H. Palmer, Terminal Building, Seattle, Wash.

**WISCONSIN MOTOR TRANSPORTATION ASSOCIATION:** President A. C. Homan, Menasha, Wis.

provided. The waterways of this country, on its various routes, actually lifted in 1919 about 250,000,000 tons. A proper development of our water channels could greatly expand this tonnage service.

One is forced to a conclusion from a survey of these factors in transportation that, in the future as in the past, this country must rely mainly on the adequate development of our railroads.

Public regulation of transportation by railroads is justified in return for the use of the right of eminent domain for roadways, and on the broader ground of public interest, because in the hands of their operators rests the power, by rate relation and rate discrimination, practically to make or unmake whole communities. In the past regulation which destroyed the current earning power of railroads, undermined with it the credit of such railroads also. Thus, by curtailment of both earning and credit, they were denied, wholly or partly, the ability to expand their facilities with the expanding tonnage of the country and in anticipation of further growth. Enlightened self-interest requires a fair and even generous interpretation of regulation of these great arteries of commerce.

Before large investments are made in terminal facilities and equipment in these railroads, there should be a comprehensive survey of the future of transportation in all its various forms, and then intelligent preparation for expanding commerce of the country which will fall upon these avenues of transportation. This should be painstaking and guided by the wisest vision. Only by such intelligent consideration will it be possible to key transportation to production in America.

### Highway Association Opens Offices in Capital

THE American Association of State Highway Officials has opened its general offices in Washington, D. C., in the Munsey Building. W. C. Markham is in charge, with the title of executive secretary. Miss Ouida Cox, a member of the office staff of W. S. Kellar, the Alabama state highway engineer, has been assigned to the Washington office to assist in the statistical and other work which will be undertaken by the new organization.

The Washington office of the association was established principally for the purpose of gathering helpful information for the use of all the state commissions, and to have a permanent point of contact with the federal government.

One of the early studies will cover the subject of highway maintenance. Facts and figures will be collected to call attention to the large saving which can be made by the institution of the patrol system. Just at this time when the public is showing some disposition to scrutinize highway expenditures more closely than ever before, it is regarded as desirable to point out ways whereby

maintenance costs can be reduced. It will be pointed out that this system of upkeep is by no means an experiment. It is simply the application to the highway of the section gang method which has been employed so many years on the railroads. Instances will be cited where

great economies have been made possible by the installation of this system. Attention will be called to the fact that the policy of having each contractor lay a certain amount of material on a road is not only unsatisfactory, but also costly.

## Far East Using Bus Service

By W. L. IRVINE

Automotive Trade Commission  
U. S. Department of Commerce

JAPAN leads not only in the present consumption of motor vehicles, but also in the possibilities for the future. China is a promising field, as its walls can be used for highways, and some of the wall material is now being used for road building.

There are good roads in the Straits Settlement and Malay Peninsula. The automobile business there depends upon the condition of the tin and rubber markets, since these commodities are the main businesses.

In Japan the motor-driven vehicle is proving quicker than the leg-drawn two-wheel carriage, and also more economical in distances in excess of a mile. Hard surfaced highways, connecting the major cities in Japan, will probably be completed within two years. In Tokyo the new roads are sure to bring about suburban development, for the city is crowded. This will mean the introduction of bus transportation, which makes its appearance now whenever conditions are favorable.

### BUSES ON CHINESE CITY WALL

The Celestial Empire progresses, as is shown by the fact that a motor road on top of the great Chinese wall, or built out of the material of the wall, is being seriously considered. The late city wall of Canton, which looks not unlike a section of the great wall, serves as a top surface for 28 miles of highway, over which motor buses and motor cars are now running.

In China hundreds of miles of new proving quicker than the leg-drawn five years, under conditions far from peaceful. Despite his conservatism the Chinaman is a gambler, and prospects of profits cause him to take risks. Here is how it works out: A group of Chinese are attracted by the bus idea and plan a route between two settlements. There is no road there, so by paying *komsha* (graft) to the authorities they secure the right to construct a highway, usually dirt, and are given an exclusive franchise to operate vehicles over it. A certain part of the revenue collected from fares goes to the authorities for protection. This then becomes a toll road and everyone using it has to pay for the ride. The rich as well as the poor of the neighborhood use the buses. The routes are well patronized, as the Orientals love to ride. It

is not an uncommon thing to see a Chinaman to take a bus ride for a couple of hours, and then walk back home because he cannot afford to pay for a return journey.

Generally speaking, the buses in China are mounted on passenger car chassis and carry about a dozen people, although the light bus chassis is beginning to be favored. The traffic with the passenger cars is that capacity limits are not regarded. The Chinaman is out to get all he can in the shortest possible time, and if the bus will move the load, then everything is all right. It is better business to get larger orders, and some of them are coming into the

The best equipped buses in China are operated in Hongkong. In Victoria, the main city of Hongkong, there are wide, well-paved streets. With the introduction of good highways people are moving out of the congested center. The place is too small to make railroad operation profitable, so that the expansion depends almost entirely on motor vehicles. Already there is a first-class bus line operating from across the island.

The only transportation in the city of Canton is provided by motor buses, and these are always crowded. The venture has not been a financial success, not because of bad management or bad equipment, but because of the heavy taxes which were imposed by the former administration of the district.

Korea, now part of the Japanese Empire, is mountainous, and this makes railway building expensive, so there are not at present any plans for expansion. The main line traverses the country from north to south, and the government plans to build highways to connect with this. The motor bus has taken hold in Korea, and at the present rate of 800 or so motor cars a year, a bus service is being organized. The buses are fairly good cars, with extra seats, usually carrying about ten people. As rapidly as they are completed franchises to operate the lines are granted. The majority of these have been granted at the expense of ruinous competition.

In the Straits Settlement and the Malay States the tin mines are a considerable distance from the nearest towns. They are not connected by railroads, so bus lines have sprung up all over the country. One can travel from one end of Malaya to the other in buses and motor cars which have regular runs. The buses are run from

Abstract of paper before EXPORT MANAGERS' Convention, National Automobile Chamber of Commerce, held Jan. 1923 in New York City.

the mines for the Chinese miner, who is off to town just as soon as he draws his pay check.

### Future S.A.E. Meetings

THE first transportation meeting of the Society of Automotive Engineers will be held April 26-28 in Cleveland, Ohio. The two days' session, to be concluded by a transportation dinner, will be devoted solely to the use of motor vehicles and their design for the business of transportation. During the meeting sessions will be held on operation and maintenance of motor buses, motor trucks, taxicabs and motor rail cars. Visits will be made to representative automotive factories in Cleveland and vicinity.

The announcement has also been made that the summer meeting of the society will be held June 19-23 at Spring Lake, N. J., on the Atlantic Coast, instead of in the Middle West as has been the practice for a number of years. The next annual meeting will also represent an innovation, since it will be held in Detroit some time in January, 1924. For years the annual meeting has been held during Automobile Show Week early in January in New York, and the change has been made to avoid the numerous conflicts resulting.

### Regulation of Motor Vehicle Common Carriers

AT A MEETING of the New York Electric Railway Association held on Jan. 25 in New York City, D. C. Fenner of the Motor Vehicle Conference Committee discussed the present condition of motor vehicle regulation, and gave the arguments for and against state control or regulation.

After a thorough investigation of the subject, the Motor Vehicle Conference Committee, consisting of representatives of the American Automobile Association, Motor and Accessory Manufacturers' Association, National Automobile Dealers' Association, National Automobile Chamber of Commerce, and the Rubber Association of America, has concluded that, granted a state needs regulation of motor vehicles as common carriers, the following fundamental principles should underlie laws on the subject:

1. Control over intrastate transportation of persons and property for hire, over regular routes or between fixed points, if adopted, should be exclusively in the hands of some agency of the state. No power whatever in the premises should be vested in the governing bodies of the municipalities of the state.

2. Such state control over motor vehicle common carriers should be placed in existing commissions, such as public utility commissions, etc., of the various states. It should be provided, however, that at least one member of such a commission should be conversant with and in sympathy with motor transportation.

3. As a prerequisite to the operation of the motor vehicle common carrier, the owner thereof should be obliged:

(a) To obtain a certificate of public convenience and necessity, with a proviso that lines in actual operation before the law goes into effect shall be regarded as necessary to public convenience and necessity, and therefore automatically granted a certificate.

(b) To take out liability insurance adequate to indemnify injuries to persons or damage to property resulting from negligent operation.

4. The state regulatory bodies having control over motor vehicle common car-

riers should be vested with the same powers they exercise in controlling other forms of utilities.

5. Any special or extra fees levied on motor vehicle common carriers should be utilized exclusively for highway maintenance. Such special or extra fees should in no case be more than 100 per cent greater than the normal registration fees for the vehicles of the class to which they belong.

6. Legislation should be enacted enabling steam railroads, trolleys and shipping companies to acquire, own and operate the motor vehicle in conjunction with their regular line of business.

## Engine Behavior Under High Compression\*

BY J. H. HOLLOWAY, H. A. HUEBOTTER,  
AND G. A. YOUNG

Purdue University Engineering Experiment Station

DETONATION, according to this paper, is ordinarily accompanied by one of two characteristic kinds of knock. Sharp metallic "ping" that is most commonly encountered in automotive engines appears to originate from too early ignition of the compressed charge. This knock, if due to excessive spark advance, is eliminated by proper timing of the ignition. If retarding the spark produces no diminution of the knock, preignition is probably due to some overheated spot within the combustion chamber.

A second kind of detonation occurs after ignition has started from the electric spark and is characterized by a dull, heavy thud. Such a knock is evident at times in both high and low compression engines. It is apparently an intermediate stage between auto-ignition and normal combustion. With high compression pressures, ignition that is timed to occur after the dead center may be followed by this heavy thud when the engine is thoroughly heated up. Automobile engines with the usual compression ratio show the same trait, when the spark is retarded after a period of preignition, owing to an early spark or to excessive carbon deposit. One form of detonation may merge into the other or may disappear entirely, depending upon the condition of normal engine operation. Sufficient spark lag will eliminate the heavy pounding, but at the expense of both power and economy.

The kind of detonation that occurs after ignition, according to the paper, is due to the presence of high temperature areas, which ignite the unburned gas before the spark has a chance to do so.

In carrying out the tests to determine the maximum compression pressures that could be used without detonation under representative operating conditions, it was found that spark plugs with porcelain cores and small electrodes were the first sources of preig-

nition. Mica cores with heavy electrodes and water-jacketed shells were required to maintain practical working temperature of the plug. In redesigning the engine for further tests, mica plugs were incorporated in the cylinder heads.

Next the exhaust valves showed unmistakable signs of overheating. In the two cylinders that detonated first the exhaust-valve seats were not completely water jacketed, and could be cooled sufficiently to eliminate preignition only with a water-outlet temperature below 100 deg. F. This engine was not a good example of modern poppet-valve design. The trouble from overheated valves was eliminated by changing to a sleeve-valve type, with which further investigations were conducted.

In an engine with suitable spark plugs and effective cooling of the water-jacketed walls of the combustion chamber, the temperature of the piston heads is the deciding factor in limiting compression pressure. This surface, being most distant from the origin of combustion, is in the best position to detonate the final portion of the charge ahead of the flame front. On account of their higher conductivity, aluminum pistons remain cooler than gray iron pistons, and hence reduce the tendency of the engine to detonate. The original gray iron pistons were therefore replaced by aluminum pistons of practically the same design.

The breaker of the battery system, with which the engine was originally equipped, failed under the high primary voltage found necessary to assure reliable ignition with high compression at full throttle. This difficulty was overcome by the substitution of a high-tension magneto.

The salient features in the engine that permitted the carrying of high compression under all conditions of operation were:

1. Effectively cooled spark plugs.
2. Comparatively cool exhaust valves.
3. Uniform circulation in the water jacket.

\*Abstract of paper given Jan. 10, 1923, at New York annual meeting, Society of Automotive Engineers.



4. Carburetion system that gave good distribution with low mixture temperatures.

5. Aluminum-alloy pistons.

6. Ignition system capable of producing adequate spark under high compression.

From these tests, which the authors state cover only a narrow range in the field of gasoline engine operation, it was concluded that increase in the compression ratio results in a marked improvement in the thermal efficiency and

in the general performance of the engine, at all loads, and in the maximum power at all speeds. Under laboratory conditions a compression pressure of 120 lb. per square inch is feasible when the engine is designed with full regard for the elimination of factors that induce detonation. Under service conditions the same attention to these factors will permit the use of much higher pressures than those common at present in the internal-combustion engine used for automotive service.

lines and give to the front a cellular appearance of square diamonds or hexagons, according to the shape of the ribbons.

Two sides of each air passage, as a rule are formed by water ribbons and the other by the surface. It is possible, however, to join the corners of zigzag ribbons together to form a core without connecting the ends, and this construction is sometimes used. The water passages or the ribbons are from 0.05 to 0.06 in. wide. The air cells are from 3/16 to 1/4 in. square.

Air-tube cores are made up of short tubes packed closely together in horizontal rows, with their ends flared and soldered to form the front and back of the core. Air passes through the tubes, while the water fills the entire space around the tubes, and flows in any path from the top to the bottom. In appearance air-tube cores resemble ribbon cores and both belong to the cellular class. Air tubes have no true surface being heated by direct contact with the hot water. In some cases baffles, or dents, are formed in the tubes to increase their effectiveness in cooling. This result is produced, not by an increase of the surface, but by a turbulence in the air flow that renders the same amount of surface more effective. Air-tube cores have been made with both round and square tubes, but neither type has been much used owing perhaps to the cost of manufacture. Diagrammatic drawings of all three types of cores are shown here. The examples under ribbon cores are so numerous that only a few common forms are illustrated.

A study of the cooling capacities of typical radiator cores suggests several interesting conclusions, which may be stated as follows:

1. Between ribbon and air-tube cores as classes, there is little to choose for the speeds used in automobiles. For low air velocity, ribbon cores are slightly better. For higher air velocity the results are about on a par.

2. The baffles, or dents, used in air-tube cores add materially to the cooling, without increasing the surface or weight.

3. The straight-walled ribbon core, having small square cells with 50 per cent of indirect surface, cools as well as other ribbon cores with 100 per cent direct surface. This result is partly due to the greater amount of surface possessed by the small cell core, but it also indicates that the indirect surface of this type of core is nearly equal to the direct surface in cooling ability.

4. The fin-and-tube core has only about three-quarters of the cooling capacity of the best forms of ribbon core of the same size. This is not surprising in view of the large amount of indirect surface contained in the fin-and-tube type.

The cooling of the thermosyphon cores may be taken as about two-thirds of that for pump circulation, and the water circulation as about one-fifth as

## Cooling Capacity of Radiators\*

By E. H. LOCKWOOD

Assistant Professor of Mechanical Engineering,  
Yale University, New Haven, Conn.

A RADIATOR is used to cool the jacket water of engine cylinders. Its ability to dissipate heat depends not only on the extent and form of its cooling surface, but also on the velocity at which the air and the water flow past the surface. The air velocity in the case of automobiles and trucks is frequently low, and must be supplemented by a fan which is driven by the engine.

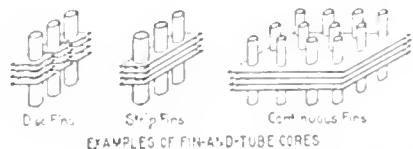
The cooling capacity of a radiator can be increased by adding to its depth, without changing the frontal area. The increased depth will be accompanied by a proportionate increase of the cooling surface and the quantity of circulating water, but no change in the air flow. It follows that, although the capacity will increase with the depth, it will do so in a diminishing ratio, and will reach a limit where no further increase of the depth will be justified.

A radiator contains tanks located on the top and at the bottom to receive and to distribute the water. A cellular portion, usually called the core, occupies the space between the top and the bottom tanks and serves to cool the water. Numerous small passages allow the water to flow through the core, while provision is made for air to circulate freely around the hot metal to remove the heat. In addition to the parts mentioned, a protecting case usually is added to support the radiator and to give a pleasing appearance to the front of the vehicle.

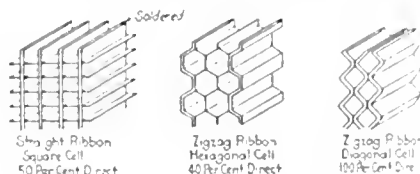
The core is made preferably of rectangular outline and of uniform depth or thickness. It is constructed in a variety of forms, but all have the same characteristic thin-walled water passages, with free air circulating on their exterior. With regards to their heat-dissipating properties, cores may be divided into three classes: (a) fin-and-tube, (b) ribbon and (c) air-tube.

In the first type the water passages are straight tubes leading from the top to the bottom tanks, with fins attached to give an increased surface for removing the heat. The tubes usually are cylindrical, but occasionally are

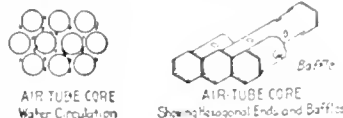
drawn in oval or flat forms. Disk fins are made by soldering to the tube at close intervals round or square metal plates of about twice the diameter of the tube. This method of construction is varied by using, instead of fins, strips that are punched to receive a



EXAMPLES OF FIN-AND-TUBE CORES



EXAMPLES OF RIBBON CORES



Examples of three types of radiator cores in general use.

row of tubes. A more common arrangement is called the continuous fin, since it consists of a larger plate punched to receive all the tubes of the core. Whatever the type may be, the fins are spaced about equal distances apart and are usually five or six per inch. The tubes are of 1 to 2-in. diameter.

In the ribbon-core type the water passages are formed between parallel plates, which are separated slightly by crimping the edges, or by using a spacing wire and then soldering them. The water ribbons are made the full depth of the core, and extend from the top to the bottom, where they are fastened to the water tanks. The ribbons have either straight or zigzag channels. They are separated at regular intervals by the attached ribs, or fins, which serve the double purpose of stiffening the core and increasing the amount of surface for dissipating the heat. The attached fins are laid out in regular

\*Abstract of paper given Jan. 12, 1923, before Society of Automotive Engineers, New York.

fast These figures are based on an arbitrary temperature drop in the radiator, and may be revised to suit the existing data. It is likely that the temperature drop may be much less than that assumed, as an active circulation may be kept up by the steam bubbles in the pipe leaving the cylinders, even with the water at nearly a constant temperature.

### Indiana Bus Owners Fight Proposed Legislation

THE Indiana Bus Owners' Association has joined forces with the Allied Motor Commerce, the Wholesale Grocers' Association and other organizations in fighting the Moorhead bill, which would place all bus and truck lines under the control of the Public Service Commission.

H. E. Jahns of Laporte, president of the Bus Owners' Association, appeared before a Senate committee in opposition to this proposed law. He took the stand that regulation at this stage of the industry's development was premature and that in any event such regulation, unless very wisely administered would tend to throttle the business by discouraging the entrance of new capital into the industry.

### Oregon Association Active in Legislation

THE Automotive Carriers' Association of Oregon is making itself known in that State. At present the association is engaged in promoting legislation that will give the Public Service Commission power to refuse the granting of permits to lines deemed by it unnecessary. According to present laws the commission is obliged to grant permits to all applicants who comply with the requirements.

The Oregon association publishes at intervals a booklet entitled "Trackless Transit Truths."

A few of the timely paragraphs contained in recent issues of this bulletin follow:

We believe that if the motor carriers are not allowed to develop their ultimate "economies" the inevitable results will be—

First—Development of the state will receive a serious setback.

Second—Real estate, where values depend directly on transportation, will depreciate.

Third—The growth of minor cities and towns will be checked and in some cases brought to a full stop.

Fourth—It will cost more to deliver farm products to their markets and less will be received for them.

Wherever the motor has been given a fair trial and operated by responsible parties it has proved profitable to both patrons and owners. It has opened new avenues of travel, provided new accommodations for the public. Established bus lines are following schedules as regularly as rail lines. As yet they are only in their infancy, but even now, in spite of the organized clamor against them and some acknowledged imperfections, which will be overcome in time, they are winning their way.

Progress is marching on, whether all of us like it or not. What is best for the public must be. The thing to do now is to initiate wise regulations of the new means of transportation for both passengers and freight, so that the cost of operation plus a reasonable profit will insure fair rates.

Better stage service to the public of Oregon will result from two things that the Oregon Automotive Carriers' Association will seek at the next Oregon Legislature.

One is protection of the established stage lines, those rendering adequate service, from the inroads of fly-by-night or good-weather competition, and the other is a change in speed which will permit of 30 miles per hour, instead of the 25 miles as prescribed by the laws of today.

A guarantee of protection for the established stage line by giving it a prior right to operate until it is proved that its service is inadequate, or traffic demands greater transportation facilities, is really a guarantee of protection to the public.

Why? Because that which protects stage lines attracts new capital into the stage field, and new capital means more and better equipment—fleets of de-luxe highway Pullmans—operating on schedules sufficient to meet every reasonable demand from an exacting public.

Increasing the speed limit from 25 to 30 miles per hour means faster service for you, Mr. Average Citizen. It will enable you to make stage journeys much more quickly, without in any sense increasing the risk. The public demands a faster pace than 25

miles over the straightaways utilized by the average car owner at considerably over 30 miles per hour—when the speed cops are not around. A 25-mile limit under such circumstances is an aggravation to the public and an invitation to the stage driver, urgently seconded by passengers, to break the law.

Why not let your legislative representatives know that you favor this thing in order that this modern form of transportation, upon which the public has so firmly placed the stamp of approval by its ever-growing patronage, be given greater opportunity to develop?

The officers of the organization are: President, Max H. Clark, Portland; vice-presidents, J. W. Parker, Salem, and V. C. Gorst, North Bend; secretary, J. L. S. Snead, Portland; treasurer, R. W. Lemen, Portland; counsel, John F. Logan, Portland.

## Modern Steering Systems\*

BY HERBERT CHASE  
Automotive Industries, New York

THE steering system has lagged behind in the general development of motor vehicles. Little attention has been given to safety, which should be the primary consideration. Important details such as the means for locking the yokes properly to the tie rod are overlooked too frequently. Lost motion that results at this and other points frequently makes the vehicle unsafe. In some instances it has been necessary to braze the yokes and tie rods together before the joint would remain tight. Some manufacturers, it is said, refuse to accept parts in which the limits are held sufficiently close to insure good fits, simply because they cannot be assembled so rapidly as others with greater clearance.

The primary causes of hard steering are friction and faulty design, the latter frequently resulting in the former. Insufficient lubrication is so common a fault, especially in the king pins and at drag-links and tie-rod joints, that these parts wear rapidly and often rust. This lubrication is usually a decidedly hit-and-miss factor and is seldom given sufficient attention when it depends upon a hand operation.

Failure to exclude dirt and moisture, especially at drag-link, tie-rod and knuckle joints, naturally results in excessive friction and rapid wear. Provision for adequate lubrication at all times, by means that tend to work dirt out of rather than into bearings, is a kind of antidote, partly because good lubricant properly applied tends to prevent rust and foreign matter from accumulating on the bearing surfaces, and partly because the construction that keeps the lubricant in place frequently is fully as effective in excluding dirt.

Ball-and-socket joints properly enclosed have advantages over the yoke-and-pin type in respect to the facility with which the lubricant can be kept on the surfaces, as well as in freedom

from rattle or binding, one of which defects is almost certain to occur with the conventional yoke and pin. (In the discussion of this paper, ball and socket joints were held to be objectionable because the ball becomes flattened or oval, thus cramping the steering, and they are hard to lubricate and to keep out mud or water.)

Ease of steering is affected by tire inflation, condition, character and width of tread, and by the type of tire. One authority states that the static resistance of turning offered by a tire varies inversely as the square root of the inflation pressure. Cord tires, because of the lower inflation pressure employed and the consequent greater area of tread in contact with the ground, are said to steer harder than the same nominal size of fabric tire when properly inflated. But whether this is true when the vehicle is in operation is open to some question. Pneumatic tires are said to render steering harder than solid or cushion tires.

### COMMON TYPES OF GEAR

When well proportioned and well lubricated the worm and wheel type of steering gear has excellent wearing qualities, even though the bearing area between the worm and wheel is rather small. If lubrication fails, considerable friction and rapid wear are apt to result. A disadvantage of this type is that it is practically impossible to take up any lost motion caused by wear, although when the full wheel instead of a sector is employed, the wheel can be moved successively to four different positions, 90 deg. apart, thus compensating for wear in the wheel but not for wear in the worm.

One of the most widely used types of steering gear is the screw and nut type, which is generally regarded as being very satisfactory when well made. Its chief advantage is good wearing qualities due to the large bearing surface between the screw and the nut, and its chief disadvantages are its lack of adjustability and rather high cost of manufacture when the nut is

\*Abstract of paper given Jan. 10, 1923, at annual meeting, Society of Automotive Engineers, New York.

**M**EMBERS of the Muskegon (Mich.) Interurban Bus Association are trying out a new plan of increasing the business in rural districts and further serving the public.

Under the new plan all highway crossings will be marked giving the schedule of the buses at that point. The highway crossings will also be named by the bus owners and it is planned in the future to erect waiting rooms at the points, where there is a large amount of traffic.

An effort will be made by local bus-owners to increase the business in the rural districts and especially the short-haul traffic. The bus owners expect that by posting schedules they will be able to double the business within a short time.

Recently, the local association opened a waiting room in the business district which has increased business and also added to the comfort of the passengers. The waiting room expense is more than paid for by the concessions which are operated.

The interurban bus lines operating out of Muskegon have had little difficulty in maintaining schedules during the winter despite the fact motor traffic has been curtailed greatly because of the icy condition of the highways. The county highway departments have co-operated in maintaining schedules, and not only have the buses operated without missing trips, but have maintained regular schedules.

**P**ASSAGE by the Senate of the resolution authorizing the Secretary of Agriculture to accept membership in the Permanent Association of International Road Congresses foreshadows favorable action in the House of Representatives. The resolution allows the United States to maintain the maximum number of delegates in the Congress to which any country is entitled. It will permit the United States to be represented by fifteen delegates. The cost of these memberships is to be paid out of the 3 per cent of the total highway appropriation which is allowed the Bureau of Public Roads for the administration of the act.

Since the final passage of the legislation now seems assured, plans already are being made to secure the meeting of the association in the United States in 1924. The meeting this year is in Seville, Spain. In that connection it is pointed out that a meeting in the United States would insure a very large attendance because of the magnitude of the highway program in progress here and because of the great use being made of motor vehicles in this country.

March 10 16 Amsterdam, N. Y. Antislavery  
March 10 17 Boston, Mass. Annual Antislavery  
March 10 17 Washington, D. C. Washington A. S.  
Connecticut Ave., Washington, A. S.  
March 10 18 Burlington, N. Y. Meeting, A. S.  
State Hotel, Burlington  
March 18 41 Greenville, S. C. Antislavery S.  
April 26 28 Cleveland, Ohio. Society of Antislavery  
Meeting,  
June 19 21 Spring Lake, N. J. Society of Antislavery  
Meeting,

**D**OWN in Florida, the Motor Truck Association of Florida is making itself known by its activities in legislative matters. W. F. Ellithorpe of Miami, state organizer, recently conducted a successful membership campaign. Other leaders in this movement were T. F. Grace, A. D. Hartzell and John Sherman of Tampa.

This association was formed last April in Orlando, having for its objects protection against inimical legislation and support of constructive legislation, encouragement of road building and protection of existing highways, elimination of unfair business methods in the hauling industry, and other objects of importance to truck owners. Be owners have recently joined the truck owners. W. T. Callahan, Miami, is president, and D. E. McMann, Miami, secretary and treasurer.

A bill is being drawn to be presented to the Legislature for the protection of bus and truck owners against extremely high license fees and high gasoline tax. Florida now has the highest license fees of any state in the Union for trucks, according to association officials. The fee for a 2-ton truck for hire, with solid tires, last year, was \$234, and with pneumatic tires, \$96, in Florida, while the average in other states was about \$33, it is stated.

**A**FTER adopting as its slogan "If it's not good for the public, it's not good for the bus business," the public safety committee of the Camden County Bus Association, Camden, N. J., recently promulgated a set of rules for busmen.

Some of these rules, announced by Charles Aceto, chairman of the committee, are:

No cars shall be operated which has bad brakes.

Racing and speeding will not be tolerated. Drivers must not smoke on the buses. No one but the driver is to occupy the driver's seat in the bus.

Buses must not pass each other on the right.

Drivers must keep their feet on the brakes in taking on or discharging passengers. They must not proceed until a patron is on and off safely.

Full stops must be made when nearing railroad crossings. The gear shift must be placed in neutral and the driver is required to look and listen.

Passengers should not be allowed to stand outside the body line of a bus. The bus door should always be closed.

plan of cutting a section Monday afternoon for an open meeting, where bus patrons may present complaints.

The official nomination for officers and directors of the American Road Builders' Association for the year 1923-1924, as submitted by the nominating committee elected at the meeting of the association held in Chicago, Ill., on May 18, 1923, are:

President, Frank Page, chairman  
State Highway Commission, Raleigh,  
N. C.

Vice-Presidents: E. L. Powers, *Ill.*, *Good Roads*, New York, N. Y.; W. E. Keller, state highway engineer, Montgomery, Ala.; S. F. Beatty, vice president Austin Western Road Machinery Company, Chicago, Ill.; Samuel H., honorary life president, Washington State Good Roads Association, Seattle, Wash.

Treasurer, James B. MacDonald  
consulting road and paving expert  
New Haven, Conn.

Directors for one year: J. R. Dancy, sales manager, United States Asphalt Refining Company, New York, N. Y.; W. A. Van Duzer, assistant maintenance engineer, State Highway Commission, Harrisburg, Pa.; Frank Sheets, superintendent of highways, department of public works and buildings, Springfield, Ill.

Directors for two years: E. I. Merren, editor *Engineering News-Record*, New York, N. Y.; I. W. Patterson, chief engineer state board of public roads, Providence, R. I.; William B. Smith, president Lane Construction Corporation, Meriden, Conn.; H. K. Bishop, chief, division of construction, United States bureau of public roads, Washington, D. C.; J. H. Crawford, president Cranford Paving Company, Washington, D. C.; C. M. Balcock, commissioner of highways, St. Paul, Minn.; H. S. Carpenter, deputy minister of highways, Regina, Sask., Canada.

Directors for three years: S. T. Henry, Allied Machinery Company of America, New York, N. Y.; R. K. Compton, chairman, paving commission, Baltimore, Md.; Fred A. Bender, engineer the Asphalt Association, Nevada, N. J.; Charles M. Upham, state highway engineer, Raleigh, N. C.; H. G. Shirley, chairman state highway commission, Richmond, Va.; Wm. P. Blair, National Paving Brick Manufacturers Association, Cleveland, Ohio; Frank Terrace, president Washington State Good Roads Association, Orillia, Wash.

## New York State Bus Association Holds Annual Meeting

ON FEB. 15 the second annual meeting of the members of the Auto Bus Association of New York State was held at the Powers Hotel in Rochester, N. Y. There was a fair attendance considering the severity of the weather. In the absence of President Alan V. Parker, Niagara Falls, Secretary-Treasurer James J. Dadd presided.

The report of the secretary showed that membership consisted at present of eleven bus companies, but that only seven had actually paid their dues and initiation fees in full. The treasurer's report showed a deficit of approximately \$10, which would be wiped out if all those who had signified their intention of joining had paid their dues.

The association, through its secretary, is urging the passage of a bill by the State Legislature that will amend the present insurance law and allow the formation of a mutual insurance company by any organization of twenty-five or more bus owners operating in the state for the purpose of carrying their own liability insurance. Discussion at the meeting brought out that on an average the intercity bus men belonging to the association paid a premium of nearly \$500 per bus per year for liability insurance alone. This rate, it was pointed out, was far in excess of the risk attendant in actual operation, for actual damages paid did not amount to more than \$50 or \$70 per year per bus. Presumably the reason for this is that nearly all the drivers are either bus owners themselves or else own stock in the bus corporations.

The meeting also indorsed the bill now before the Legislature providing for the counties cleaning the highways of snow. There was also informal discussion relative to the bill making it mandatory for all buses to have their gasoline tanks outside of the bus body.

There was some discussion as to what Governor Smith's proposals for changes in regulatory bodies might mean so far as the intercity bus lines were concerned. Carl W. Stocks, editor BUS TRANSPORTATION, outlined the bill that has recently been introduced concerning transit affairs in New York City. He also pointed out that so far as intercity bus lines were concerned these motor carriers must be operated under some form of supervision. Not that each city, town or village through which each line is operated should attempt to enforce different regulations concerning operation, but that there should be some central supervisory board that has the power to enforce regulations governing safe and efficient operation for the benefit of the bus patrons.

Only by such governing regulation, he said, can the motor bus industry of the State be put on a sound basis and cut-throat competition between bus companies themselves, the traction lines and the steam railroads eliminated. It is not a question of the survival of the

fittest, but a question of the elimination of duplication of service, which will in the end provide the community with adequate service at the lowest possible fare.

After a talk on the value of affiliating with national bus associations by Manager E. B. Burritt of the National Motor Transport Association, New York, the association discussed the question of joining in this most important work, and the following resolution authorizing Messrs. Burritt and Dadd to work in harmony with the idea of building up membership in both associations was approved:

Resolved, That the constitution and by-laws of the Auto Bus Association of New York State be changed to provide for direct affiliation with the National Motor Transport Association on the following basis:

That members of the Auto Bus Association of New York State become members of the National Motor Transport Association.

That the annual dues for membership of bus operators be changed to one-tenth of 1 per cent of the gross receipts of the preceding calendar year, with an initiation fee of \$10 for new members. The initiation fee not to apply to present members of the Auto Bus Association of New York State.

That members taken into the Auto Bus Association of New York in future become at the same time and without payment of further fee a member of the National Motor Transport Association.

Resolved, further, That the dues paid after Jan. 1, 1923, in the Auto Bus Association of New York State be divided between the two associations on a basis of 50 per cent to each;

And, further, That the National Motor Transport Association agrees to pay to the Auto Bus Association of New York State 50 per cent of dues of its members now in New York State and in the future 50 per cent of all dues and initiation fees of all members secured in New York State.

The following officers were elected for the ensuing year: President, Stanley Chatterton, treasurer White Rapid Transit Company, Lima, N. Y.; first vice-president, Neil H. McGreevy, Allegheny Transportation Company, Hornell, N. Y.; second vice-president, F. D. Carpenter, Carpenter Bus Lines, Black River, N. Y.; third vice-president, Clyde Manning, Ithaca, Cortland Bus Line, Ithaca, N. Y.; fourth vice-president, W. M. Hicks, Elmira-Ithaca Transportation Company, Elmira, N. Y.; fifth vice-president, F. J. Kroboth, Binghamton-Greene Bus Line, Greene, N. Y.; sixth vice-president, W. F. Aldrich, Aldrich Bus Lines, Norwich, N. Y.; secretary-treasurer, James J. Dadd, 120 Vermont Avenue, Rochester, N. Y.

### MEMBERSHIP CAMPAIGN INAUGURATED

On March 1 the first of a series of special meetings in an increased membership campaign was held in Albany. Representatives of some twenty bus lines principally from Albany and the immediate surrounding cities attended an all day session at the Hampton Hotel. President Stanley Chatterton, Lima, N. Y. presided. Secretary James J. Dadd explained the reason for the meeting and said that the motor bus industry was practically the only business today that had no representative association. E. B. Burritt also talked

on the work of the National Motor Transport Association. At the afternoon session a discussion on fare collection methods was led by C. W. Stocks, editor BUS TRANSPORTATION. Secretary Dadd also talked on the advantages of mutual insurance.

Another meeting is to be held March 15 at the Bennett Hotel, Binghamton, N. Y., and all bus men of New York state, whether members or not, are invited.

### Camden Association Guests at Dinner

EIGHTY association members were recently entertained at a dinner at the Ridgeway Hotel, Camden, N. J., by the United Tires Stores Company of that place. Horace L. Brewer, the new president, said he would work with state and city authorities to elevate the bus business to the highest possible standard. Thomas Rooney, of the Mutual Casualty Insurance Company, said it was his company's intention to place bus transportation in Camden as nearly as possible on a 100 per cent safety basis. The company would not tolerate recklessness on the part of drivers, he said, and warning will be given to those found operating their buses contrary to state or city ordinances. He declared drivers would have to be discharged after a second offense, or policies would be discontinued.

### Associations Formed in Iowa

OWNERS of Iowa motor bus and truck lines have formed the Iowa Motor Transportation Association, with headquarters in Des Moines. Articles of incorporation for the association have been filed.

The officers of the organization are: J. Edgington, president; E. P. Cronk, secretary, and G. C. Beale, treasurer.

Another organization composed of owners of interurban bus lines is in the process of formation, for the purpose of protecting the interests of the bus men in the Legislature. C. A. Pomeroy, Cedar Falls, and Charles Lyon, Des Moines, attorney, are prominently identified with this movement.

### Michigan Association Meets in Lansing

AT A MEETING of the Michigan Highway Transportation Association held at the Kerns Hotel, Lansing, Mich., Feb. 13, 150 members were present. A model regulatory bill drafted by the association was read and discussed, after which Attorney Caldwell presented a memorial to be sent to the legislators of the state. E. B. Burritt, manager of the National Motor Transport Association, explained the plans of that organization. A resolution indorsing this work was adopted. A banquet was held in the evening. Addresses were delivered by Clarence E. Bement, general manager of the Novo Engine Company, and Secretary of State Deland.

# News of the Road



From wherever the bus runs, are brought together the important events, here presented to show the movements of the day.



## Milwaukee Railway Expands Its Bus System

**Racine-Kenosha Line Taken Over—Milwaukee-Racine Limited Planned—Company Now Has 600 Miles of Bus Routes.**

**M**OTOR bus service between Racine and Kenosha, Wis., has been taken over by the Wisconsin Motor Bus Lines, a subsidiary of the Milwaukee Electric Railway & Light Company. A combination of local and limited motor bus service will be given. Two buses per hour will be operated with additional service on Saturday and Sunday afternoons.

Racine, a city of approximately 60,000, and Kenosha, one of about 40,000, are connected by interurban lines of the Milwaukee Electric Railway & Light Company and the Chicago, North Shore & Milwaukee Railway and by the steam lines of the Northwestern.

About two years ago a dye works concern in Kenosha started motor bus service between these two cities, using some Reo buses with locally made bodies. This service was operated by the Lake Shore Transportation Company, which planned to extend its operations into Illinois by running a line from Kenosha to Waukegan, Ill., and for a time had operated buses between Racine and Burlington, Wis., a distance of about 35 miles. The permit for the Waukegan route was denied to it, however, the Illinois Utilities Commission issuing one instead to the Chicago, North Shore & Milwaukee Railway as being in a better position to furnish an adequate service.

The Lake Shore Company decided to dispose of its equipment to the Milwaukee Electric Railway & Light Company, which was also able to acquire the equipment of another competitor, the Red Bus Lines, thus giving it control to a large extent of the intercity transportation facilities between Racine and Kenosha. The Chicago, North Shore & Milwaukee Railway has its terminals on the outskirts of both cities and is therefore somewhat at a disadvantage in trying to serve the localities.

The Milwaukee Electric Railway & Light Company decided that since there was a demand for bus service between the two cities, it would furnish it in co-ordination with interurban service. A schedule has been worked out which will give Racine and Kenosha one interurban train per hour and two motor bus trips, one of which will be a limited and will make no stops between the city limits of Racine and the city limits of

Kenosha. The rate of fare on the limited will be 30 cents, the same as on the interurban. The rate of fare on the local bus will be 25 cents. This bus will serve not so much the people of Racine and Kenosha as the smaller intermediate communities, making stops anywhere along the route.

The railway also plans to operate a limited de luxe motor bus service between Milwaukee and Racine, paralleling its own line but making no stops between terminals. At the beginning four round trips per day will be made, fitting in with the company's Racine-Kenosha bus schedule. A somewhat higher rate of fare will be charged on the limited bus between Milwaukee and Racine than is charged on the interurban railway. The latter is really a suburban line since it serves numerous small communities along the 25-mile

route and because of people constantly getting on and off is unable to make any great speed. The bus service will therefore supply the rapid transit facilities, while the interurban will take care of the more heavy local traffic. The rate of fare between Milwaukee and Racine will be 75 cents or at the rate of 3 cents per mile, and between Racine and Kenosha 30 cents. Interchangeable mileage will be accepted at about 2½ cents per mile.

Another extension in the near future of its Milwaukee-Hartford motor bus service from Hartford through Hartford and Juneau to Beaver Dam and Fox Lake has been announced by the company. This extension of an additional 30 miles of route will add another link to the already extensive motor bus system, comprising approximately 600 miles, covering southeast Wisconsin.

## Titanic Struggle Being Waged for Los Angeles Franchise

**Three Propositions, Including Plan Backed by Railways, Before Public Utility Board—Extensive Financial Interests Involved Cause Much Discussion of Projects**

**L**OS ANGELES, CALIF., is the battleground of a transportation struggle which approaches the colossal in its proportions, with a franchise for motor bus service at stake. Three applications, each backed by strong financial interests, have been submitted to the Board of Public Utilities, which is now conducting a series of hearings and conferences.

The proposal to establish a city-wide system of double-deck buses of the Fifth Avenue type as submitted by W. G. McAdoo, former Secretary of the Treasury, in behalf of Eastern capitalists, was described in the February issue of BUS TRANSPORTATION. A hearing upon this application, originally scheduled for Feb. 14, was postponed pending the arrival from the East of one of its chief promoters, Richard W. Meade.

Early in February the Los Angeles Railway Corporation and the Pacific Electric Railway jointly entered the field by the formation of the Los Angeles Motor Bus Company and the presentation of an application in the name of the new concern. On Feb. 13 the utilities board considered the proposal, which would establish combination motor bus service on Western Avenue between Hollywood Boulevard and Santa Barbara Avenue, with transfers between the buses and the street cars of the two street railways.

Officials of the railways present at the hearing explained their plan of extending the railway lines and establishing motor bus feeders adequately to meet the needs of the growing city. D. W. Pontius, vice president and general manager of the Pacific Electric Railway, told of the company's \$1,500,000 proposed Hollywood subway to give rapid transit between Los Angeles and Hollywood, the new cars recently placed in service on the Hollywood line and the motor-bus connecting lines which the company is asking permission to establish as showing what the company is doing to improve its service.

The Pacific Electric Railway and the Los Angeles Railway have recently placed an order with the White Company for 81 Model 50 chassis. The bodies, of twenty-five-passenger capacity, will be constructed in the Pacific Electric Railway's car shops at Torrance, Calif. The investment cost of the new equipment is estimated to be \$550,000.

Some of the new buses to be purchased, the railways announce, will be jointly operated by the two street railway companies and others individually, but all will be used to supplement their street car and interurban service.

On Feb. 15 the board heard the application of C. D. Gulick of Glendale, who



has filed an application for bus franchises on behalf of the Glendale Motor Bus Company and the Southern Pacific Motor Bus Company for permission to operate buses over fifteen routes covering various sections of the city, as well as connecting Los Angeles and Glendale. Glendale, which is 8.15 miles from Los Angeles, is now served exclusively with interurban service by the Pacific Electric lines. The Gulick line, which is said to be backed by local business men, plans to serve every section of the city and in a great many instances the proposed route parallels the local railway lines and the routes proposed by the McAdoo corporation.

The Southern Pacific Motor Bus Company, in its application, states that it will charge 5 cents, while the McAdoo interests plan a 10-cent fare.

#### AGITATION FOR PUBLIC OWNERSHIP AND CONTROL ANTICIPATED

While these various interests are seeking franchises, there is considerable discussion among Councilmen as to the question of municipal ownership and operation of bus lines, claiming that it is bound to become an issue before the city government in the not far distant future. Further strength to the proposal for public ownership and control of transportation facilities may grow out of the hearings to be held before the Board of Public Utilities on the various bus applications, and a sweeping review is to be made of the transportation needs of every section.

The board in deciding to handle the bus situation by a committee as a whole plans to obtain the public's view of the matter by holding a series of conferences with representatives of business, civic and improvement organizations throughout the entire city.

Leading business men, however, have differed upon these projects, some enthusiastically indorsing the proposed plan as submitted by Mr. McAdoo, declaring that public necessity and convenience demand the establishment of the bus system. Opposing factions, one of which is the Los Angeles Development League, are opposed to the McAdoo project, on the grounds that it will mean a loss of millions of dollars in street railway improvements, and classify the bus plan as a "drive for Los Angeles money on the part of Eastern capitalists."

The Board of Public Utilities has also received a plan submitted by a citizen which proposes to repeal the ordinance that prohibits the operation of buses into the congested district of the city and to establish a department of motor bus service, before which petitions for operation of bus lines would be filed. The city would make provisions in the bus franchises for the purchase of the bus lines after they have been placed in operation.

It is authentically reported at the City Hall that at least two members of the Board of Public Utilities look favorably on the entry of the motor bus into Los Angeles but the matter must be finally settled by the City Council.

## To Use Bus in Short Haul Traffic

**Railway Granted Bus Permit by Commission—Would Operate Trolleys on Express Schedules, with Buses Handling Local Service.**

THE United Electric Railways has been granted authority by the Rhode Island Public Utilities Commission to operate buses between Providence's civic center and the corner of Barton Street and Broadway, in the direction of Olneyville. This proposal first received the approval of the local authorities.

The railway will make all trolleys operating over Broadway express cars and leave the short-haul business to the buses. The proposed schedule calls for the operation of five buses during normal periods and ten buses during the peak hours. The distance to be covered by the bus route is 1.52 miles and follows Broadway, a 50-ft. thoroughfare, from Exchange Place to Barton Street.

The buses used will be of twenty-five passenger capacity. The method of fare collection will be pay-as-you-enter inbound and pay-as-you-leave outbound. Operators will use the Rooke automatic registers, which are capable of taking either the new metal fare tickets now in use, or a 5-cent piece accompanied by a cent paid into the hand of the operator. By the former method, there is a saving of 20 per cent over the latter procedure, the only requirement being the purchase of ten of these metal tickets for 50 cents. The same transfer privilege as prevails on the trolley cars, the purchase of one for 2 cents, will be in effect with the bus operation.

The United Railways now operates five bus routes, four of which are suburban and one is cross city in character. The present motorized equipment of the company is made up of seventeen buses, six Republics, six Macks and five Whites.

## Capital Traction Bus Line Authorized

The Public Utilities Commission of the District of Columbia following a recent hearing denied the petition of the Sixteenth Street Highlands Citizens Association for an extension of the Washington Rapid Transit bus line from Sixteenth and Buchanan Streets northward on Sixteenth Street. Instead, the commission authorized the Capital Traction Company to operate buses over the following parallel route: From the terminus of its Fourteenth Street line, west on Kennedy Street to Sixteenth Street, north on Sixteenth Street to Montague Street, east on Montague Street to Fourteenth Street, south on Fourteenth Street to the terminal at Kennedy Street.

The comment of the commission on the case follows:

"The Capital Traction Company stated its willingness to operate motor buses through the section covered by the pending petition as an extension

of its Fourteenth Street railway line, until the latter can be extended to the Walter Reed Hospital grounds.

"The commission is of the opinion that the operation of this motor bus line, acting as a feeder for the Fourteenth Street railway line, with a 2-cent transfer privilege between the two, will furnish convenient and adequate service to the section referred to in the petition now under consideration, and can readily be extended to provide transportation facilities for the picnic grounds and golf course in Rock Creek Park."

## Detroit Motor Bus Company Adds One Line—Plans Another

Motor bus service was started on Feb. 2 by the Detroit Motor Bus Company on West Grand Boulevard connecting the Lafayette Boulevard and Dexter Boulevard lines in Detroit, Mich.

Bus service over the entire length of East Grand Boulevard between Woodward and Jefferson Avenues, connecting at these intersections with other lines of the company, has been proposed by W. F. Evans, president of the Detroit Motor Bus Company. It was announced that this service would be started on May 1 if the company's petition for permission was granted. The operation of thirty buses would take care of the entire East Grand Boulevard route.

The matter has been referred to the street railway commission. The question has arisen whether bus lines should be first established in other sections where they can operate more efficiently in conjunction with the municipal street railway lines.

## Jersey Fare Question Hinges on March Hearing

The present situation in the Hudson Boulevard fare war may be termed an armed truce. The controversy between the bus men on the north and south lines radiating from Journal Square in Jersey City, on the one side, and the Boulevard Commission on the other, was recorded in BUS TRANSPORTATION for February, 1923, page 106. A hearing will be held on the matter early in March.

The writ of certiorari which the bus owners secured from Justice Swayze did not tie the hands of the commission as had been anticipated. Instead it reacted in a manner unfavorable to the operators on the northern route, who had been operating for a straight 10-cent fare, a privilege sought by the Southern Boulevard Association. An order of 1919 was brought to life by the commission fixing the fare to be charged within the limits of Jersey City at 5 cents. The bus men on the northerly route were obliged to comply with this measure.

As matters now appear the commission will stand on its decision to allow no fare increases and the bus men upon their demand for a straight 10-cent fare. The bus association has compiled figures tending to show the necessity of a 10-cent fare.



### Jamestown Railway Plans New Bus Line

The Jamestown (N. Y.) Street Railway announces that a new bus line will be in operation early in March. The proposed new line will serve a section of the city which at present is virtually without transportation facilities of any kind. The terminal of the new line will be at West Third and Washington Streets and the route will follow Washington Street to Fluvanna Avenue, to North Main Street, to Buffalo Street, to Allen Street, to the Jamestown-Falconer boundary line at Tiffany Avenue.

The railway has ordered five sixteen-passenger buses for delivery by March 1. When the new equipment arrives, the total number of buses owned by the company will be eleven, operating over three city routes. Previous issues of BUS TRANSPORTATION have described the installation of the west and south side lines.

### Greeley Has Bus War

Greeley, Col., has today one form of transportation—the motor bus. Furthermore, an independent company, the Greeley Transportation Company and the local railway, the Greeley and Denver Railroad, are competing for the patronage of the city's traveling public.

Upon the recent suspension of street railway service, F. E. James, as head of the independent concern, commenced operations with three Reo buses. Immediately the railway put a Stanley steamer into service and later added a White bus. No effort has been made to revive the railway service. Arthur J. Connor of Denver is in charge of the railway's buses.

Mr. James made application to the utilities commission for a permit, but that body referred his application back to the city for action. The Council so far has failed to grant any franchise and at the present time both lines are operating in the keenest kind of competition.

### Nassau Bus Line Grant Sets Precedent

In connection with the recent granting of a certificate of convenience and necessity by the New York Transit Commission to the Nassau Bus Line, Inc., to operate a bus line from Far Rockaway easterly to the city line at Lawrence, it is brought out that this application was the first one received by the Transit Commission under a franchise legally granted by the city, and the franchise is the first to be granted by the Board of Estimate since the decision of Justice Mullan last October in which operation carried on merely under permits issued by the Commissioner of Plant and Structures was declared invalid. The action of the Board of Estimate in the Nassau Line case apparently fixes a precedent under which other bus lines still in operation without legal authority may be validated in similar manner. The law

provides that after the Board of Estimate has granted a franchise where the proposed line is located in New York City, application shall be made to the Transit Commission for a certificate of convenience and necessity.

The company has now resumed operations over the entire length of its original route from Lynbrook, Nassau County, to Far Rockaway in Queens. Prior to the granting of the permit, the line was run only from Lynbrook to the city line as operations within the city limits had been halted by an injunction. The company is to pay the city 5 per cent of its gross receipts. It formerly paid nothing.

The president of the Nassau Bus Line is Paul M. Wiedemann of Brooklyn.

### Action on Buffalo Applications Postponed

The Buffalo Transportation Board recently refused bus franchise sought by the Buffalo Jitney Owners' Association, Motor Bus Drivers Union No. 363 and E. K. Jaggard were referred by Commissioner Probert at a recent meeting onto the Public Service Commission at Albany had passed up the proposal. The delay was the result of a recent hearing in Buffalo, at which counsel for the International Railway appeared in opposition to the granting of the application.

The Buffalo Jitney Owners' Association asks the privilege of operating over Niagara at Albany Street and Delaware, Bailey and Kentucky Avenues.

## British Bus News Summarized

### Both Sides of Controversy Between London General Omnibus Company and Competitors Presented—Bus Employees Oppose Wage Decrease—Successful Trolley Bus Operations Carried On in Birmingham

THE pros and cons of competition with the London General Omnibus Company and its allies were put before the public early in February. Lord Ashfield, chairman of the company, said that the number of buses competing for traffic in the streets of London was increasing. These newcomers did not propose to take their share of the lighter traffic routes. The London General Omnibus Company could not stand idly by and see the results of life-long work seriously prejudiced by the conduct of irresponsible people.

As Lord Ashfield saw it, the public demanded services which in many instances were not remunerative, because the population tended to live in an ever-widening area. There should, he contended, be an obligation on all transport undertakings to make provision for those unremunerative facilities, provided that in the aggregate the earnings were sufficient to meet all the expenses. If there was to be competition without regulation, it would have unfortunate consequences both to the public and to the bus employees. Wasteful transport meant inefficient service and higher fares and more precarious employment and lower wages for the employees. The services which the London General Omnibus Company provided included many unremunerative routes, the object being to furnish London with adequate transport. It did not ask a monopoly, but only that every traffic undertaking should be regulated in the interests of the public. Small bus companies had never shared the burdens. They sought the routes of dense traffic and ran their buses only with a view to serving their own interests. They interfered with the successful conduct of the system of transportation and seriously restricted its expansion and development. His company was providing the best service in the world at fares lower than were

charged in other large cities, and was giving its employees more favorable conditions than were to be found elsewhere.

To this statement Percy Frost Smith replied. He is at the head of the concern which has recently put on the streets several petrol-electric buses, easily distinguished because they are painted blue, while the London General buses are painted red. Mr. Smith said that the policy of the London General Omnibus Company was directed toward obtaining a monopoly. The streets were open to any one who obtained licenses for running vehicles. No sane individual was going to operate a bus where the traffic was so congested that he could not earn a living. After eighteen years' service with the firm of Thomas Tilling, he felt that he could design a petrol-electric bus which would prove a better vehicle than any now operating. To demonstrate this and to get money for developments, he began running six buses of the new type. He was risking his own money, friends were backing him and a company was about to be formed to market his type of bus all over Great Britain. He had made an honest attempt to open a route of his own in London, a cross-country one, without undue interference with the London General Omnibus Company's working arrangements. He had six buses running on this route, on which he had been assured there was no adequate service, and he received the support and thanks of the traveling community.

After being on the route for fourteen days, he found that the London company had put on more than twenty buses in competition with his fleet. This step had rendered the route unprofitable to him and to them. It might make it necessary for him to select certain special highly remunerative routes in order to try to evade the attentions of the

"Underground" group. He objected to the term "irresponsible" being applied to enterprising men who were trying to get their living honestly and giving good service to the public at the least possible cost to the passenger.

The London General Omnibus Company's employees have on a ballot rejected a proposal for a reduction of wages. The vote was 8,803 votes to 1,501. Negotiations had gone on between the company and the Transport and General Workers' Union and the negotiating committee of the latter had advised acceptance of the proposals. Under these there would have been a reduction of 2s. a week in the pay of drivers and 6d. in that of conductors. Future adjustments were to be made quarterly on the basis of an increase or decrease of 1s. for every four points rise or fall in the cost of living index figure. Negotiations will be continued.

At a recent inspection of the railless trolley bus system in Birmingham, which began operation in November last, a number of interesting particulars were forthcoming. The route, which is served by twelve double-deck trolley buses, is 2½ miles long and is described as the Nechalls route. Formerly it was served by a tramway, but the tracks were torn out and the Town Council decided that the traffic did not warrant the reconstruction of the tramway at the high post-war prices. Thus the trackless trolley system was adopted. The trackless cars can also run over tramway routes, a skate being used to make contact with the rails for the return current. When they are running on their own route, with the double trolley wires, they have freedom of movement over the whole width of the roadway.

### New Ohio Concern in the Field

The Zanesville & Dayton Transportation Company has been incorporated in Columbus with officials of two Springfield (Ohio) traction companies as the incorporators and officials. The incorporators, however, deny that the two railways—the Indiana, Columbus & Eastern, and the Columbus, Newark & Zanesville lines—have any financial interest in the bus project.

The officers and incorporators of the new company are: President, John S. Bleeker; general manager, C. C. Fast; secretary-treasurer, F. A. Healy; superintendent, Ralph Jacobs; counsel, Paul Martin; head of department relations, Arthur Bland. The bus company is capitalized for \$5,000.

The first bus line was placed in operation on Feb. 12 between Columbus and Grove City, Ohio, two buses being used. Eventually it is planned to operate a system throughout the state. The Columbus-Grove City line will have its station and parking space at the Indiana, Columbus & Eastern station in Columbus. Trolleys operated between the two points leave on the even hour; the buses will leave on the half hour, and one hour apart.

### Auxiliary Bus Service to Be Added to Toledo Traction System

At a recent meeting of the Council of Toledo, Ohio, Street Railway Commissioner W. E. Cann was directed to make plans for the installation of bus lines on South Erie Street and from the Fasset Street bridge to the end of the Oak Street line. The tracks and wires in South Erie Street from Monroe Street to Swan Creek will be removed and trolley service discontinued on that route. These bus lines will be operated as a part of the Community Traction Company system.

### Metropolitan Bus Lines Involved in Litigation

On Feb. 9 the Appellate Division of the New York Supreme Court granted an injunction restraining the operation of the Concourse and Washington Heights bus lines in New York City. These lines, which are operated under the supervision of the Department of Plant and Structures, however, are still doing business by reason of the filing of an application for an appeal, which acts as a stay on the operation of the injunction. The bus lines involved in this litigation charge a 5-cent fare.

The Appellate Court on March 2 denied the petition for an appeal vacating the stay of the injunction. It is said that the city will renew efforts to carry the case to the higher courts.

Another phase of the situation is the announcement by the Third Avenue Railway that in July, 1920, the Concourse Transportation Company, a subsidiary of the railway, submitted an offer to the Board of Estimate to operate buses on the Grand Concourse for a 5-cent fare with an additional 3-cent charge for transfers to Third Avenue Railway lines. S. W. Huff, president of the railway, recently wrote the Board of Estimate requesting action on his company's application.

### Competition Keen in Richmond, Va.

Richmond, Va., is experiencing a transportation war for the business of the west end of the city in what is known as the Fan District, where electric railway service cannot be obtained. The battle was launched on Feb. 1 when the Richmond Rapid Transit Corporation began operation of twenty-six buses in competition with about fifty Ford touring cars operated by the Richmond Jitney Association.

The first step was a court action taken against the new company by the jitneys, when one of the buses of the transit company turned off its route fixed by ordinance and returned to the city without a load. The company was promptly fined. Two days later, on an exceptionally cold morning, twenty jitney drivers were haled to court for failure to operate their cars for the service of the public during the early morning hours. Under the law regular service must be kept up during the en-

tire day. The operators were convicted and fined.

The Richmond Rapid Transit Corporation has invited the public to ask for its service in any section of the city. Officials have stated that it will be extended only on such petitions and on the promise of the public's support.

### Increased Bus Operations in Omaha District

Omaha, Neb., continues to grow as a bus center. The Boulevard Transit Company recently opened the first motor bus service ever operated between Omaha and Sioux City, Ia., a distance of 105 miles. The schedule calls for one trip each way daily. This company already has buses in operation between Omaha and Fremont, Neb., with a schedule of five return trips every day. One bus is in operation between Sioux City, Correctionville and Merville, Ia. Two new buses, with White model 50 chassis, have been ordered for use on the Sioux City line.

The White Transportation Company, operating between Omaha and Lincoln, has arranged to use the Boulevard Company's Omaha station at 1715 Douglas Street, which is in the business district. The White company now makes four round trips daily between Omaha and Lincoln, a distance of 65 miles. This company also operates between Lincoln and York, Neb.

### Railway Organizes Subsidiary Bus Corporation

The Rochester Railways Co-ordinated Bus Lines, Inc., has been incorporated in the office of the Secretary of New York State at Albany. The directors of the new concern are officials of the New York State Railways. Under the terms of its charter, the new concern may operate bus lines. Crosstown bus lines connecting railway routes in Rochester are under consideration.

To provide transportation facilities to Rochester's outlying districts, the operation of buses between Dewey Avenue, Rochester, and the Stone Road, Greece Township, is planned. The railway already has franchises from the city for the extension of its lines and has recently made application to the township for the necessary permits.

The plan to install crosstown trolley-bus lines, mentioned in the September issue, has been abandoned.

### Extensive East Shore System Contemplated

The first link in a proposed motor bus system that would traverse the nine counties of the eastern shore of Maryland has been established by the Shore Transit Line, between Salisbury and Claiborne, Md.

According to General Manager R. T. Bonham, another line under consideration would serve the towns of Hurlock, Williamsburg, Federalsburg, Denton, Goldsboro and Church Hill. A connecting link between Chestertown and Elkton is also proposed.

## Many Bus Proposals in Massachusetts

**Entrance of Railways Into Bus Field  
Stirs Up Discussion—Malden Becomes  
Center of Conflict Between Railway  
and Independent.**

THE recent action of two Massachusetts railways in applying for permission for the operation of buses over their systems has created a great deal of discussion in the localities affected by the projects. This seems to be particularly true of Malden and Revere.

In Revere a mass meeting was held protesting against the grant of bus franchises to the Eastern Massachusetts Street Railway. Representatives from localities traversed by this line have appeared before the State Utilities Commission in opposition to the railway's plan.

In Malden the situation has a triangular aspect. Not only does the Eastern Massachusetts Street Railway seek a franchise for bus operation in that city but the Boston Elevated Railway and Joseph Hart, an independent operator, are involved in a controversy over bus operation on Salem Street, east of Malden Square.

The City Council has granted franchises to these two competing lines, but the Mayor has not yet approved them. The Boston Elevated Railway takes the position that if the community prefers the independent service, it will not enter into competition with the bus operator, but the elevated does propose, if the Mayor signs the Hart franchise, to discontinue its railway service from Malden Square east on Salem Street.

At the time this is written the matter is still undecided. One aspect of the situation should not be overlooked. There is no question as to the popularity of the buses no matter how involved the controversy may be that exists regarding the operators.

### Three Bus Proposals Before People of Saginaw

Three separate plans for providing Saginaw, Mich., with transportation facilities, will be presented to the voters of that municipality this spring.

On March 7 a ten-year franchise for the Saginaw Motor Omnibus Company will be submitted to the voters. This proposition was described in the February, 1923, issue of BUS TRANSPORTATION. If this franchise does not carry, two other plans will be presented.

One of these is the petition of the Saginaw United Transit Company for a three-year franchise. This company guarantees an eight-minute schedule and proposes to charge a 5-cent cash fare and 2 cents for transfers. If granted a franchise, this concern promises to operate sixty-five twenty- and thirty-passenger buses. The Saginaw United Transit Company operates the present independent system of buses in the city.

The third proposition in an amended form is the street car bus franchise,

which failed of passage by a few votes last November. The Board of Commerce has secured over 7,000 signers to a petition for the resubmission of this measure. This will be presented to the Saginaw electorate at a special election April 2, providing the omnibus company franchise fails. It is said both the advocates of the present bus system and the backers of the street car-bus joint plan will oppose the Saginaw Omnibus franchise.

### Independent Company Wins Santa Monica Franchise

The commissioners of the City of Santa Monica, Calif., have awarded to the Bay Cities Transit Company a blanket bus franchise providing for the operation of a bus line in the Santa Monica Bay district for a period of six years, for a consideration of \$11.

The Bay Cities Transit Company was the only bidder when the franchise was put up for sale, although the Pacific Electric Railway entered a counter proposition to operate over the same route under permit. Owing to the fact that the franchise calls for a 5-cent fare the railway's proposition was not approved. The present street car fare is 6 cents.

The Bay Cities company has for several years been operating bus lines in the Santa Monica Bay district, and its general manager states that additional buses will be placed in operation and a more efficient schedule arranged.

### Three Applicants for Tacoma Hospital Line

Three applications for a certificate of public necessity from the state Department of Public Works have been filed for a proposed stage line from Tacoma, Wash., to the new Veterans' Bureau Hospital to be built at once on the Camp Lewis Military Reservation.

The City Transportation Company, now operating stages to Steilacoom, is one applicant, claiming that any other company given the right to operate to the hospital would have to duplicate the Steilacoom run nine-tenths of the way. The United Auto Transportation Company, operating from Tacoma to Camp Lewis, also wants the line. The third applicant is C. P. Sharman, one of the members of the United Auto Transportation Company.

### Bus Service Proposed for Cheyenne

Application for the operation of bus lines in Cheyenne, Wyo., has been made to the city by the Casper Bus & Transfer Company. The proposed routes do not parallel the lines of the Cheyenne Electric Railway, which has indicated it would not oppose the granting of a franchise to a non-competing line.

S. H. Pontonney is manager of the company, which operates a bus system in Casper. If granted the franchise, his company plans to use twenty-five passenger buses. A Cheyenne-Fort Russell route is also under consideration.

### Changes Made in Rockford Routes

The Rockford City Traction Company on Jan. 15 made a change in its bus system by establishing two new city through routes. At the same time the Charles Street, Greenwood and South Rockford feeder lines were discontinued as such as the through route, taking care of the territory.

The company has also been forced to operate a bus during the rush hour between the Main Street and Washington in South Rockford at the northern extremity of the Seventh Street car line.

### Springfield Mayor Declares War on Independent Operators

Mayor Leonard of Springfield, Mass., has expressed a purpose to terminate independent bus service in that city and has warned the operators that they need not expect that their municipal licenses would be in force for more than one year following the expiration of the present term, May 31 next. The buses are regulated by a transportation committee of the City Council, through its jitney supervisor. By abolishing the independents the Mayor hopes to bring the Springfield Street Railway more fully under municipal regulation, induce that company to put on a fleet of buses for feeder lines and rush-hour emergencies as well as obtain some reduction in car fares or the alternatives of cheaper rates for ticket strips or lengthened zone limits.

President Clark V. Wood of the railway is said to have given his assurance that the railway would take steps to provide a complete transportation service in the event of existing competition being removed, but has remained non-committal on the proposal of accepting a larger measure of municipal regulation. Officers of the Motor Bus Owners' Association say they are not dismayed by the Mayor's stand and declare that the independent jitney operators will proceed with their plans to install new and larger buses in operation the coming spring.

### Jacksonville Considers Installation of Municipal Buses

Plans for a municipally owned motor bus line between Jacksonville and South Jacksonville, Fla., have been drafted by a special committee of the City Council and submitted to that body.

These plans call for a bus system to be financed by the city's use of \$10,000 of paying lien certificates. The committee recommended that the proposition be submitted to the taxpayers at a special election.

To Use Buses Instead of Laying Tracks. The Princeton Power Company, which has from time to time been urged to build an electric railway between Princeton and Athens, W. Va., has declared the proposition impracticable, and instead has launched a plan to operate a bus line.

### Syracuse-Watertown Line Planned

Establishment of bus service between Syracuse and Watertown, N. Y., a distance of 72 miles, is announced by Albert F. Warner, Watertown, who with several Syracusans will own and operate the company.

The present plans call for three round trips each day. Buses will leave at both terminals at 8 a.m., noon and at 5 p.m. Each bus will have a capacity of twenty passengers. Several machines are to be bought by the new company.

### Twenty-one Million Bus Riders in Paterson During 1922

Bus transportation in Paterson, N. J., made rapid strides during 1922, according to reports on file at the Traffic Commissioner's office. One hundred and forty-four buses carried a total of 21,806,217 passengers during the year, an increase of 4,433,500 over 1921. The city's share of 5 per cent of the gross receipts, together with the income derived from permits and transfers, amounted to \$44,843.05, which is an increase of \$11,160.87 over the preceeding year's revenues.

An indication of the growth of the business and its importance is given in the statement that in 1919 the receipts for the city amounted to \$13,000 and that today the capital equipment is estimated at \$500,000. Sixteen new buses were added during 1922.

**Canadian Exhibition Train to Tour France in Buses.**—According to plans now being formulated, the proposed Canadian exhibition train to tour France will be made up of a caravan of especially constructed motor buses.

**Hoboken Business Men Ask for Bus Line.**—Hoboken, N. J., business men, through the Chamber of Commerce, have asked the Hoboken Jitney Owners' Association to establish a bus line between Hoboken and North Hudson.

**California Company Plans Extensive New Line.**—The California Transit Company is contemplating an important addition to its already extensive system. The proposed route would start from the foot of Hyde Street, San Francisco, and connect with Napa, Calistoga, Stockton and Sacramento Valley points.

**Illinois Railways' Bus Feeder Lines Expanding.**—Illinois railways are planning more extensive use of the motor bus as an adjunct to their railway systems. Evidence of this tendency is the recent application of the Peoria Railway, a part of the Illinois Traction System, for the permission of the Illinois Commerce Commission to operate bus feeder service on the West Washington Highway.

**New Terminal in Minnesota Bus Center.**—A union bus terminal has been established in Virginia, Minn., for the accommodation of the patrons of these lines: The Range Rapid Transit, Biwabic Transfer, White, Anderson and West Virginia Companies.

## Tabular Presentation of Recent Bus Developments

Company	Address	Route
<b>Incorporations</b>		
Chicago Heights & Joliet Transportation Co.	Joliet, Ill.	Chicago Heights to Joliet
Blue Star Motor Bus Co.	Gary, Ind.	
American Cab Co., Inc.	Hammond, Ind.	
Ohio-Kentucky Transp. Co.	Ironton, Ohio	Ironton to Ashland, Ky.
Bon Air Bus Line, Inc.	Mobile, Ala.	Bon Air to Mobile, Ala.
Lenoir-Blowing Rock Line	Lenoir, N. C.	
Peoples Park Bus Co.	Paterson, N. J.	
Bus Transportation Co.	Wheeling, W. Va.	Wheeling
Zanesville & Dayton Transp. Co.	Springfield, O.	
<b>Applications Filed</b>		
Anderson Bros.	New Bethlehem, Pa.	Hawthorne to Oakland, Pa.
Philip Noe		Coulterville to Kinsley, Cal.
Connie McCloskey	Tulsa, Okla.	Tulsa
Wolverton Auto Bus Co.	Port Angeles, Wash.	Brimmon to Port Angeles, Wash.
Joseph Morawa	390 East St., Hartford, Conn.	Hartford
Fred Carpenter		North Tonawanda, N. Y.
White Star Bus Line		Peoria to Farmington & Galesburg, Ill.
Kipps' Express & Van Co.		Chicago to Joliet, Ill.
Yellow Bus Co.	Oil City, Pa.	Oil City to Clarion, Pa.
Clarion Bus Co.	Clarion, Pa.	Oil City to Clarion, Pa.
A. C. Tidwell		Fresno to Los Banos, Cal.
Santa Rosa-Petaluma-Suasalito Auto Stage Co.		Cotati to Sebastopol, Cal.
G. Ray Fleming	Sunbury, Pa.	
Geo. S. Jones Co., Inc.		Los Angeles to Artesia, Cal.
United States, Inc.		Niland to Brawley, Cal.
Carson-Tahoe Transp. Co.		Lakeside to Tahoe City, Cal.
E. S. Brown	Belbort, N. Y.	Patchogue to Yaphank, N. Y.
<b>Permits Granted</b>		
B. L. Halverson		Modesto to Don Pedro Bar, Cal.
C. C. Cope	Manitowoc, Wis.	Manitowoc
Floyd Tripp		Eagleville to Cedarville, Cal.
Jacob J. Good	Irwin, Pa.	
J. B. Enos	Lindeneau, N. J.	Weaverville to Peanut, Cal.
A. V. Casner		Lindeneau to New Brunswick, N. J.
Dillingham Transp. Co.		Santa Fe Springs, Cal.
Jona Borden	Decatur, Ill.	Decatur
Ventura Transp. Co.	Ventura, Cal.	Ventura to Foster Park, Cal.
Anthony De Marco		Elizabeth to Glassport, Pa.
California Transit Co.		San Francisco to Merced, Cal.
Middelsex Bus Owners Assn.		Fords to Rahway, N. J.
S. L. James		Mariposa to Rugby, Cal.
Motor Transit Co.	San Francisco, Cal.	Riverside to Redlands, Cal.
Yakima Eastern Transp. Co.		Yakima to Prosser, Wash.
C. D. Gulick		San Fernando to Los Angeles, Cal.
West Ridge Transp. Co.	Girard, Pa.	Erie, Pa. to Conneaut, Ohio
<b>Applications Denied</b>		
Auto Interurban Co.		Vera to Spokane, Wash.
White Star Bus Co.	Peoria, Ill.	Chillicothe to Sparta, Ill.
F. W. Hyserman		Albany to Castleton, N. Y.
Mt. Wilson Stage Line		Pasadena to Los Angeles, Cal.
Mexico Stage Co.		Tia Juana to San Diego, Cal.
<b>Lines Started</b>		
Hal A. Sidles		Wichita to Anthony, Kans.
W. N. & Carl French	Coleman, Tex.	Coleman to Brownwood, Tex.
Edward Bennett	Hillsboro, Ohio	Hillsboro to Cincinnati, O.
Horace L. Asbell	Huntsville, Mo.	Macon to Moberly, Mo.
Elkhart & South Bend Bus Co.		Goshen to South Bend, Ind.
Blue Bus Line	Decatur, Ill.	Champaign to Decatur, Ill.
Stanley Baker		Alma to Greenville, Mich.
Roy Spruce		Arkadelphia to Gurdon, Ark.
Elmer Hammonds	Greensboro, Ala.	Greensboro to Tuscaloosa, Ala.
G. D. Steele	St. Albans, W. Va.	St. Albans to Nitro, W. Va.
Ortonville Transp. Co.	Ortonville, Minn.	Ortonville to Sioux Falls, S. D.
O. H. Woosley		Ortonville to Wahpeton, N. D.
Red Star Bus Co.	Shoals, Ind.	Ortonville to Milbank, S. D.
Claud Phillips	Orange, Tex.	Shoals to Washington, Ind.
C. M. Brandon		Springfield to Lima, Ohio
E. R. Webb		Orange
Star Taxi Co.	Lexington, Ky.	Aberdeen to Columbus, Ohio
Reliable Motor Bus Line	Salina, Kans.	Lexington to South Elkhorn, Ky.
Ross Horlocker	Kewanee, Ill.	Concordia to Salina, Kans.
Fayette Transp. Co.		Kewanee to Sheffield, Ill.
F. S. Sapri		Liberty Center to Toledo, Ohio
Lot Lenord		Payette to Glasgow, Mo.
Richmond Rapid Transit Co.		Canton to Youngstown, Ohio
		Wichita to Eldorado, Kans.
		Richmond West End
<b>Lines Proposed</b>		
Mid-West Dispatch Co.		Chicago to Davenport, Iowa
Ultimate Bus Co.		Benwood to Wheeling, W. Va.
Woburn & Reading Bus Co.	Woburn, Mass.	Hudson to Concord, Mass.
Highway Motor Bus Co.	Detroit, Mich.	Lansing to Flint, Mich.
T. R. Gillespie		Lansing to Jackson, Mich.
C. H. Wooley	Kokomo, Ind.	Kokomo to Elwood, Ind.
F. E. Davis	Buffalo, N. Y.	Niagara St., Buffalo
Howard Allen	Eutaw, Ala.	Eutaw to Tuscaloosa, Ala.
George Rutledge	Eldorado, Kans.	Eldorado to Wichita, Kans.
Herbert F. Gates	Pittston, Pa.	Pittston to Dupont, Pa.
Monticello Improvement Club	Ellington, N. Y.	Ellington to Jamestown, N. Y.
Glendale Motor Bus Co.	Monticello, Iowa	Oxford Junction to Monticello
William Miller	Glendale, Cal.	Glendale to Los Angeles
Waterloo, Cedar Falls & Northern Ry.	Sandusky, Ohio	Tiffin to Oak Harbor, Ohio
Wilkes-Barre Ry. Co.	Waterloo, Iowa	Waterloo to Cedar Falls, Iowa
Casper Motor Bus Co.	Wilkes-Barre, Pa.	Wilkes-Barre
	Casper, Wyo.	Cheyenne, Wyo.

**Bus Succeeds Defunct Railway.**—Following the suspension of operations by the Concord, Maynard & Hudson (Mass.) Street Railway, bus franchises have been granted to A. J. Lovell to cover the territory formerly served by the railway.

**Merchants Take Over Buses for Sales Day.**—The merchants of Beaver Falls, Pa., in order to give shoppers from near-by towns reduced fares on Dollar Day, Feb. 15, took over the bus lines serving the Darlington and East Palestine districts.

**Buses Run When Trolley Tracks Halt Trolley Operation.**—Buses were put into use between Windsor Locks, Conn., and the State line when the rails of the Hartford & Springfield Street Railway were so covered with ice recently that trolleys could not be operated.

**Iowa Railway Buys Bus Line.**—The Johnson bus line, operating between Waterloo and Cedar Falls, Iowa, has been purchased by the Waterloo, Cedar Falls & Northern Railway and will be operated in co-ordination with the electric railway service between the cities.

**Tacoma Railway to Use Buses.**—The Tacoma Railway & Power Company, Tacoma, Wash., plans the operation of buses from the city hall to the waterfront flourmills, in preference to the re-establishment of street car service on Pacific Avenue, north of Seventh Street, in Tacoma.

**Seven New Bus Routes in Schenectady.**—Fourteen buses are operating over seven routes in Schenectady, N. Y., aiding the local railway in handling passenger traffic. The installation of this emergency bus system was a result of a movement instituted by Mayor Whitmyre and other city officials.

**Buses Succeed Street Cars on Washington Line.**—The Public Utilities Commission of the District of Columbia has given the Washington Railway & Electric Company permission to substitute buses for street car service over the Tenleytown-Potomac Park line from Seventeenth and H Streets to Potomac Park. Car service is operated also during the rush hours. Service started Feb. 17. Free transfers between buses and trolleys are issued.

**Seattle Council Rejects Damage Claims.**—All claims arising from the accident at the West Wheeler Bridge, Seattle, Wash., on Dec. 30 (described in BUS TRANSPORTATION for February, 1923), when three people were killed in a collision between an automobile and a municipal bus, have been rejected by the Council. It is contended that the city was in no way to blame for the accident.

**Northumberland Railway Considers Use of Buses.** The Northumberland County Railway, Sunbury, Pa., has under serious consideration the purchase of two up-to-date buses to be used in transporting passengers to Hamilton and the east end section of Sunbury, doing away with the branch trolley line, which extends from Second and Reagan Streets to Hamilton.

**Danville Appreciates Bus Service.**—Recognizing the value to the merchants of the city of the motor buses that operate between Danville, Ill., and adjacent counties, the City Council of Danville has granted the Reo Motor Bus Company the free use of the streets. These buses bring into Danville several hundred shoppers each day and their trade amounts to many thousand dollars weekly.

**Bus Proves Valuable in Emergency.**—The motor stage stepped into the emergency recently in Chehalis, Wash., when the electric railway service of the North Coast Power Company, between Chehalis and Centralia, was temporarily suspended due to the burning out of a generator in the company's power house. The railway supplied bus service during the three-day shutdown, satisfactorily handling the usual traffic.

**British Columbia Railway Joins Bus Operators.**—Under the terms of a recent agreement between the British Columbia Railway and the city of Vancouver, B. C. (see BUS TRANSPORTATION for February, 1923) the railway plans to commence by April 1 the operation of motor buses in the Grandview district of the city. A contract for two White chassis has been let. The bodies will be built in Vancouver and will have a seating capacity of twenty-one passengers.

**Bus Service For Wilkes-Barre's West Side.**—Motor bus service supplemental to its regular railway operations in the city of Wilkes-Barre, Pa., is proposed by the Wilkes-Barre Railway. A charter for the operation of buses is being sought in the name of the Wyoming Valley Autobus Company, whose chief incorporators are railway officials. The proposed route covers the growing west side section and is said to be meeting with popular approval.

**Co-ordinated Bus and Railway Service Proposed for Des Moines.**—Following the presentation of a petition to the Des Moines (Iowa) Council by the members of the Four Mile Improvement League, asking for better transportation service, steps were taken to secure auxiliary bus service from the Des Moines Street Railway, which operates the local traction system. Officials of the railway were said to have several lines under consideration. The section mentioned in the petition is the northeast corner of Des Moines.

**Oregon Line Has Fine Record.**—A concrete demonstration of the usefulness of the motor stage as an efficient method of transportation is noted in the fact that for the first time in the history of the towns of Prineville and Mitchell, Ore., highway transportation between the two places has continued uninterrupted every day during the winter, despite the fact that the Ochoco Highway is still uncompleted. Although in past years the stage service between Crook and Wheeler Counties has been irregular during the winter months, the John Cornett Stage Line has operated on schedule all winter.

## Financial Section

### Yearly Report of Newark Bus Operations Shows Great Increase

More than 76,000,000 passengers were carried by buses in Newark, N. J., during 1922, according to figures compiled by J. J. Kroehl and made public by Director Howe. This is an increase of 23,000,000 over the total number carried in 1921. The gross revenues for 1922 were \$5,818,759, an increase of \$1,148,276 over the preceding year. The 5 per cent gross earnings tax paid the city amounted to a total in 1922 of \$119,956. The average number of buses operating in Newark during the year was 402.

The enormous growth of the business in the city since its inception in 1916 is best illustrated by the accompanying table:

	Operating Receipts	Tax Pay	Passen- gers
1916	\$133,046	\$5,506	2,660,874
1917	417,774	17,352	8,195,497
1918	536,952	26,121	17,120,658
1919	1,444,700	74,655	36,823,110
1920	2,670,523	135,532	53,410,466
1921	2,675,082	78,979	41,501,854
1922	5,818,759	149,956	76,375,199

### W.I.A.T. Corporation Granted Fare Increase

Under an order granted by the New York Public Service Commission, on Feb. 15, the Woodlawn Improvement Association Transportation Corporation, operating in Albany and vicinity, put into effect an increase of from 7 to 8 cents in the fare charged on its city lines. It is said that the corporation will apply to the commission for a rehearing of the case for permission to charge a 10-cent fare.

According to the order of the commission, the fare between points within the city and those beyond the limits is fixed at 15 cents. There are many points of interest to bus owners in the comments on valuation and operating expenses to be found in the memorandum of the commission on the case. An abstract of this memorandum will appear in an early issue.

### Ohio Line in Receivership

The J. B. Cox Transportation Company, Alliance, Ohio, which has been operating buses between Canton and Alliance, has been placed in receivership by Common Pleas Judge Agler on the application of stockholders of the company. The court named J. A. Kress as receiver.

This action followed the filing of a petition by the Mack International Truck Company to replevin seven buses sold to the Cox Company. A tire concern had previously removed the tires from all buses, causing suspension of the service.

## Comparative Statement of Operations of Chicago Motor Bus Company for 1922, 1921, 1920 and 1919

	1922	Cents Per Bus-Mile	1921	Cents Per Bus-Mile	1920	Cents Per Bus-Mile	1919	Cents Per Bus-Mile
Gross earnings:								
Transportation revenue.....	\$961,955.80	47.59	\$777,495.30	47.00	\$639,547.20	44.23	\$606,036.50	40.91
Special bus revenue.....	1,206.00	0.05	495.50	0.03	660.00	0.05	200.00	0.01
Advertising revenue.....	9,470.82	0.47	10,516.43	0.64	7,263.61	0.50	2,742.64	0.19
Total operating revenue.....	\$972,632.62	48.11	\$788,507.23	47.67	\$647,470.81	44.78	\$608,979.14	41.11
Non-operating revenue.....	8,793.68	0.43	3,553.22	0.21	3,391.75	0.23	1,467.08	0.10
Total revenue.....	\$981,426.30	48.54	\$792,060.45	47.88	\$650,862.56	45.01	\$610,446.22	41.21
Operating expenses, maintenance way and structures:								
Repairs to buildings.....	7,961.29	0.39	1,289.44	0.08	889.54	0.06	1,521.49	0.10
Depreciation to buildings.....	3,750.00	0.19	2,600.02	0.15	.....	.....	.....	.....
Total.....	\$11,711.29	0.58	\$3,889.46	0.23	\$889.54	0.06	\$1,521.49	0.10
Maintenance of equipment:								
Superintendence.....	12,617.63	0.62	13,131.88	0.79	10,491.56	0.72	11,821.20	0.80
Repairs to bodies.....	24,930.01	1.23	15,008.34	0.91	12,277.94	0.85	12,966.81	0.88
Repairs to running gears.....	72,355.85	3.58	64,255.22	3.88	61,948.63	4.28	61,504.78	4.15
Repairs to engines.....	23,712.56	1.17	16,293.10	0.98	15,760.25	1.09	13,046.35	0.88
Repairs to electrical equipment.....	8,491.52	0.42	8,303.05	0.50	7,957.14	0.55	9,482.74	0.64
Repairs to service equipment.....	1,066.73	0.05	1,794.96	0.11	2,879.59	0.20	3,811.44	0.26
Miscellaneous shop expense.....	13,859.92	0.69	17,654.15	1.07	13,815.94	0.96	13,252.01	0.89
Tires (reserve).....	21,129.68	1.05	30,772.63	1.86	18,760.85	1.30	31,156.49	2.10
Total.....	\$178,163.90	8.81	\$167,213.36	10.10	\$143,891.90	9.95	\$157,041.82	10.60
Depreciation.....	64,776.24	3.20	52,891.42	3.20	46,499.25	3.22	47,714.19	3.22
Gasoline.....	83,717.42	4.14	62,787.26	3.80	70,673.72	4.89	59,079.06	4.00
Conducting transportation:								
Superintendence.....	24,599.50	1.21	13,684.63	0.83	13,351.20	0.92	12,442.74	0.84
Conductors and drivers.....	227,601.86	11.26	190,210.38	11.50	166,522.77	11.51	151,103.21	10.20
Miscellaneous trans. expenses.....	13,506.75	0.67	8,630.66	0.52	6,022.40	0.42	7,055.00	0.47
Lubricant.....	6,003.75	0.30	8,199.70	0.50	16,624.58	1.15	12,447.31	0.84
Garage employees and expenses.....	26,816.47	1.33	20,302.13	1.23	20,156.23	1.39	21,786.66	1.47
Station expenses.....	1,304.94	0.06	1,058.31	0.06	948.03	0.07	845.99	0.06
Total.....	\$299,833.27	14.83	\$242,085.81	15.64	\$223,625.21	15.46	\$205,660.91	13.88
Traffic expenses.....	484.28	.....	.....	.....	2.00	.....	571.79	0.04
General and miscellaneous:								
Officers' salaries and expenses.....	22,995.50	1.14	22,397.83	1.35	7,315.38	0.51	5,848.61	0.39
Office salaries and expenses.....	11,210.31	0.55	9,249.98	0.56	10,763.02	0.74	10,710.89	0.72
Miscellaneous.....	35,869.06	1.77	20,516.83	1.24	12,360.56	0.85	10,606.70	0.72
Injuries and damages (reserve).....	26,035.71	1.29	22,468.02	1.36	14,504.30	1.00	14,825.98	1.00
Insurance.....	10,556.12	0.52	5,930.12	0.54	10,840.17	0.75	11,027.52	0.74
Stationery and printing.....	2,575.31	0.13	2,582.04	0.16	2,328.16	0.16	2,442.23	0.17
Storeroom expenses.....	3,562.53	0.18	2,877.60	0.17	6,614.80	0.47	7,911.06	0.53
Law expenses.....	10,089.43	0.50	6,386.66	0.39	.....	.....	.....	.....
Total.....	\$122,893.97	6.08	\$95,409.08	5.77	\$64,726.39	4.48	\$63,372.99	4.27
Taxes:								
City taxes.....	5,031.13	0.25	7,367.30	0.45	4,327.83	0.30	3,480.96	0.23
Licenses.....	6,270.50	0.31	5,330.52	0.32	5,311.64	0.37	3,026.46	0.21
Boulevard privileges.....	33,075.81	1.63	24,863.48	1.50	16,815.58	1.16	15,884.77	1.07
Capital stock tax.....	5,863.14	0.30	971.92	0.06	3,012.12	0.20	381.00	0.03
Other taxes.....	2,556.60	0.12	2,056.39	0.12	2,246.60	0.16	1,660.42	0.11
Total.....	\$52,797.18	2.61	\$40,589.61	2.45	\$31,713.77	2.19	\$24,433.61	1.65
Total expenses.....	814,377.55	40.28	664,866.00	40.19	582,022.78	40.25	559,415.86	37.76
Net earnings.....	167,048.75	8.26	127,194.45	7.69	68,839.78	4.76	51,030.36	3.45
Income deductions:								
Interest on funded debt.....	220.00	0.01	2,440.00	0.15	2,845.00	0.20	7,890.00	0.53
Interest on unfunded debt.....	25,049.33	1.24	17,616.45	1.00	7,396.20	0.51	4,049.48	0.27
Discount on funded debt.....	.....	.....	.....	.....	4,889.45	0.34	8,622.36	0.58
Total.....	\$25,269.33	1.25	\$20,056.45	1.15	\$15,136.65	1.05	\$20,561.84	1.38
Net income.....	141,779.42	7.01	107,138.00	6.54	53,703.13	3.71	30,468.52	2.07
Revenue bus-miles.....	2,021,543	.....	1,654,100	.....	1,446,031	.....	1,481,311	.....

**Ohio Line Sold.**—The Mechanicsburg-Urbana, Ohio, bus line has been sold to George Stross of Piqua, by Charles Brazill, who has gone to Covington, Ohio, to operate another line.

**Northern New York Line Changes Hands.**—The Ogdensburg-Alexandria Bay, N. Y., line has been sold to Fred Rutherford and Horace Allen by George Willard, who has operated the route under the name of the Willard Bus Lines.

**Niagara Falls-Lockport Line Sold.**—The Frontier Automobile Transfer Company, Inc., Niagara Falls, N. Y., which has been operating a fleet of buses between Niagara Falls and Lockport for more than a year, has sold its equipment and franchises to A. L. Slavin of 1830 Ontario Avenue, Niagara Falls.

**Ohio Motor Bus Company Elects Officers.**—Under a reorganization, recently effected, the new officers of the Ohio Motor Bus Company are: F. M. Morrison, Columbus, president; E. B. Alspach, Newark, vice-president; I. C. Robinson, Westerville, secretary and

treasurer; John B. Miller, Westerville, general manager.

**Coast Line Increases Stock.**—The Camas Stage Company, which operates buses between Camas, Wash., Portland, Ore., and Vancouver, Wash., has filed amended articles of incorporation, increasing the capital stock of the company to \$20,000. The officers of the concern are W. T. Crawford, president, and Max Clark, secretary.

**Reading-Pottstown Line Seeks Fare Increase.**—A new rate schedule to be effective March 15 has been filed with the Pennsylvania Public Service Commission by the Reading-Pottstown bus line. Increases of 1 cent per zone in cash fares, workmen's rates and strip tickets are announced. Rates for school children are increased from 3½ to 5 cents.

**Dillingham Corporation Succeeds Co-Partnership.**—E. B. Dillingham and H. L. Dillingham, co-partners doing business under the name of the Dillingham Transportation Company, have been granted permission by the California Railroad Commission to transfer the stage line and operating rights of

that co-partnership between Long Beach and Whittier to the Dillingham Transportation Company, a corporation.

**Colorado Company Reports Increased Business.**—According to Victor De Merschman, manager of the White Bus Lines operating between Grand Junction and Montrose, Col., the business of the line during 1922 showed a decided increase over the 1921 figures. During 1921 4,600 passengers were carried and 7,603 in the following year. The business for the month of December, 1922, was reported to have been greater than that of any previous month in the year.

**Bridgeport Company Reorganizes.**—The Grey Line Bus Corporation, which operates from the General Electric plant in East Bridgeport to Seaside Park in West Bridgeport, Conn., recently reorganized and elected the following officers: President, H. Dryer; treasurer, A. Patrick; secretary, A. Kimball. The board of directors is made up of bus owners operating the line. Plans are under way for the standardization of equipment and for a revision of schedules.



# Bus Regulation



## Interstate Line Takes Legal Action

**El Paso-Los Angeles Company Sues City of Los Angeles to Obtain Permit—Complicated Legal Situation Exists.**

FOR some time the El Paso and Los Angeles Stage Line Company has been endeavoring to obtain a permit from the Board of Public Utilities of Los Angeles for rights to operate an interstate motor bus line between Los Angeles and El Paso, Tex. The board denied the permit and now the motor bus company is endeavoring to compel that body to grant the desired permit by filing a petition for a writ of mandamus in the Superior Court.

The bus company asserts that its line is to be operated for the carrying of interstate business exclusively, and, due to this fact, it presents a legal difficulty as to who has control over operations of this nature, whether the jurisdiction rests with the city of Los Angeles, the State of California or the United States Government. Counsel of the motor bus company claims the State Railroad Commission has declared that it has no jurisdiction to regulate the bus line, which is engaged in interstate commerce.

The bus interests declare that since the city of Los Angeles is vested with rights to regulate traffic on its own streets the Board of Public Utilities has the power to grant it a permit to operate under the same conditions as those involving the bus lines entirely within the city.

## No Damages for Injuries on City Buses, Says Court

According to a recent decision handed down by the Appellate Division of the New York Supreme Court, the city of New York is not liable for injuries sustained by passengers of buses operated by the Department of Plant and Structures.

This decision was handed down in the \$10,000 suit brought against the city by Helen O'Reilly and is regarded as establishing a precedent for such cases. The decision, signed by three of the five judges, held that the city was not empowered with authority to run bus lines and was therefore irresponsible.

## Colorado Commission Drafts Safety Measure

The following safety rule was recently promulgated by the Colorado Public Utilities Commission:

"All transportation companies are required and ordered to stop each and every automobile stage, wagon, sleigh or any other vehicle engaged in the transportation of passengers before

crossing the tracks of any steam, inter-urban or other railroad, such stop to be made not less than 20 ft., nor more than 75 ft., from the nearest rail of the railroad over which the highway crosses.

"After making the stop the operator of the vehicle shall carefully look in each direction and shall not start his stage until it has been ascertained that there are no cars, engines or trains approaching the crossing from either direction.

"The foregoing rule shall not apply to the operation of passenger stages within a municipality as regards passing over the track of electric or other street railroad."

## What the Legislatures Are Doing

**Bus Regulation and Taxation Bills Introduced in Nearly All State Legislative Bodies—Gasoline Tax Is Favorably Considered by Many Legislators**

AT THIS season of the year the voice of the legislator is heard in the land, and 1923 has seen to a greater extent than any previous year the attention of the legislative bodies directed toward taxation and regulation of the bus industry. The legislatures of the various states with few exceptions now have under consideration measures which, if they became laws, would have a direct relation to the business of bus owners in general.

In the main the recommendations made by governors and utility bodies as outlined in BUS TRANSPORTATION for February, 1923, have been followed out in the drafting of legislation. At the time this account is written, several measures bearing upon the bus industry have passed one of the legislative branches and are before the other body, but the great majority are still in committee.

A bird's-eye view of the legislative situation from a national angle may be gleaned from the accompanying summary of legislation advanced by the lawmakers of the different states.

### GASOLINE TAX GENERALLY ADVOCATED

There seems to be a general tendency toward the levying of taxes on gasoline in states which do not already have such a law on the statute books. This tax in the majority of cases is levied upon all dealers in gasoline. Where it applies only to wholesalers, it is so indicated.

Bills providing for a gasoline tax of 1 cent per gallon have been proposed in Massachusetts, New Hampshire, Ohio, Vermont and West Virginia and for a 2-cent tax in Alabama, Arkansas (wholesale), Idaho, Indiana, Maine, Michigan (wholesale), Montana, Nevada, Washington and Wyoming (wholesale). In Utah a tax of 2½ cents per gallon is under consideration. Three cents per gallon is the tax proposed in bills introduced in Arizona and North Dakota. In Delaware a measure has been introduced stipulating a tax of 1 cent per

gallon of gasoline during 1923 and 2 cents per gallon thereafter.

The Ball-Focht bill introduced into the two national bodies provides for a tax of 2 cents per gallon on all gasoline sold in the District of Columbia and a registration fee of \$1 for all motor vehicles, to be effective Jan. 1, 1924. California lawmakers have for consideration two measures proposing a gasoline tax, one for a 2-cent and another for a 1-cent tax. Two gasoline tax proposals are before the Iowa Legislature. One calls for a tax of 2 cents per gallon on all gasoline sold and the other for a tax of 1 cent per gallon to be paid by the retailer and not to be added to the retail price of gasoline. Two measures have also been introduced into the Oregon Legislature, one providing for a 4-cent and the other a 3-cent per gallon gasoline tax.

Other measures seek to levy a tax upon the gross profits on receipts for gasoline sales. In Arkansas a measure has been advanced providing for a tax of 1 per cent of the gross profits derived from sale of gasoline by wholesalers. In North Carolina, House Bill No. 456 provides for an annual license tax of 1 per cent of the gross sales of gasoline which amount to more than \$25,000 yearly.

A bill before Texas lawmakers fixes a tax at 5 per cent of the receipts derived from sale of gasoline.

Seattle Granted Right to Operate Buses. A bill which the city passed the Washington Legislature gave the city of Seattle authority to operate motor buses in connection with the municipally owned street carway system. The bus lines are entirely under the supervision of the city and are to way under the authority of the Department of Public Works. The bill was drafted to permit the city to operate buses in the outlying districts instead of making street car extensions, and will also give the city the right to parallel the lines of the Rainier Valley Electric Railway, which is owned by the city. The railway now operates four bus routes with the city units.

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### OTHER PROPOSED LEGISLATION

Aside from the legislation relating to gasoline taxation, other important bills affecting the industry are under discussion in many states.

In California there has been introduced an act, sponsored by Senator Arbuckle, by which all motor bus and freight transportation companies would pay 7 per cent of their gross earnings to the State. The revenues derived from this taxation would be used for state highway construction and maintenance. The bus and truck men are perproposing this bill on the grounds that

their business is under the regulation of the Railroad Commission and any change would necessitate an amendment to the constitution. Such an amendment could not be submitted until the election two years hence.

Colorado bus operators would be affected by a bill which would place all bus lines completely under the regulation of the Public Utilities Commission, from which body a certificate would first be secured. With each application, the bus owner would be required to file indemnity bonds or insurance policy in such sum as the commission may deem necessary. The annual license fees would be revised so that all buses with pneumatic tires carrying seven or less passengers would be assessed \$60, from seven to twelve passenger buses \$100, twelve to eighteen passenger buses \$200, those carrying more than eighteen, \$360. Motor vehicles with rubber tires other than pneumatic engaged in the transportation of passengers would pay a 20 per cent higher fee than the foregoing and if equipped with metal and steel tires 50 per cent more.

A bill regulating the operation of buses in Delaware has been introduced by Representative Little. According to its provisions bus owners would be required to secure a license from the secretary of state. Bus owners would be compelled to pay a \$10 license fee and carry \$5,000 accident insurance for machines with seating capacity of less than seven and pay a license fee of \$30 for those seating more than seven. A \$25,000 insurance policy would be required for buses of more than seven-passenger capacity. Drivers would have to secure special licenses.

In Illinois a bill has been introduced to grant to cities, villages and incorporated townships the right to acquire and operate transportation systems and to make grants of the use of streets for such systems.

Foremost among Indiana legislation is the Moorhead bill, recently passed by the Senate, which would place all trucks and buses under control of the Public Service Commission. A similar measure has been introduced in the lower body in that state.

A Kansas House bill would place bus lines under the control of the Public Utility Commission. It provides for a tax of 1 cent a ton mile for vehicles with pneumatic tires and 1½ cents a ton mile for those equipped with solid rubber tires.

In Michigan a bill placing buses and trucks under the control of the Public Utilities Commission has been submitted to the Legislature. This bill places a tax at 5 per cent on gross earnings. A \$2,000 indemnity insurance per car is provided in another clause. A capacity weight limit of 20,000 lb. is stipulated in the bill.

A 25 per cent tax on the earnings of Minnesota buses and trucks is proposed in a bill introduced in the Senate. Another bill gives the State Railroad & Warehouse Commission supervision of all bus lines excepting those operating

within limits of a municipality, which are regulated locally.

Regulation of motor bus operations in Nebraska is embodied in a measure brought forward by Senator Banning. This bill calls for the collection of annual license fees ranging from \$60 to \$400, depending upon seating capacity, and provides for maintenance of personal injury insurance by bus owners.

In New Jersey several bills relating to the bus industry have been thrown into the legislative hopper at Trenton. On Feb. 6 a bill was presented giving street railways the right to operate motor buses. Senator Mackay is the author of a bill giving the Boards of Freeholders in all counties increased powers over bus lines. The Lyons bill introduced in the Assembly would give municipalities greater control over bus lines running wholly within their borders. The Assembly has passed two bills sponsored by Mr. Hershfield, one granting counties proportions of 5 per cent tax on buses based on mileage of county roads traversed and another providing that all drivers of motor buses must pass a physical test before being granted licenses.

Many are the transportation bills before the New York lawmakers. Chief among these are the so-called Smith utility bills which would abolish the public service commission and give municipalities the right to establish, acquire and operate public utilities. The transit program of Mayor Hylan is embodied in proposed legislation, which gives the city of New York virtually complete control over its transit facilities. This bill provides for municipal operation of bus lines. Assemblyman Ullman has brought forward a bill requiring all motor buses in Greater New York to carry insurance policy or indemnity bonds of \$5,000. Another bill would make compulsory the use of a standard signal device to be attached to all automobiles. The Stapley bill would make it necessary for all bus drivers to secure a general operator's license. This applies to operators in counties not wholly within a city. Control over these licenses would be vested in the Tax Commission. Operators in cities wholly within the limits of a county would have to take a local operator's license, likewise under the control of the Tax Commission. A measure fathered by Senator Webb authorizes supervisors to appropriate from motor vehicle fees sufficient funds to remove snow on state and county highways. Another bill would compel motor buses to place their gasoline tanks on the outside of their vehicles.

Because of the mode of taxation proposed, bills introduced by Messrs. Freeman and Collister are of importance to Ohio bus owners. A graduated scale of taxes increasing with the weight of the bus and its passenger capacity is provided ranging from 2 cents a mile to 10 cents a mile. These bills also provide for the regulation and control of buses in the same manner prescribed for other public utilities. All applications are to be accompanied by a

liability insurance bond. Safety and regulatory rules are to be promulgated by the commission. The Sullivan bill before the lower house would require all bus lines to carry liability insurance.

A joint highway committee of the Wisconsin Legislature is drafting a bill which would considerably increase the tax on buses. It is said that the minimum fee would be \$352 per car. Weight will be the determining factor in this tentative bill.

In the Rhode Island Legislature the repeal of the Joslin jitney law, by which all buses were declared common carriers and subject to public utilities commission regulation, is sought in a measure advanced by Mr. Shawcross.

Senate Bill No. 208 before the West Virginia Legislature would vest the collection of motor vehicle licenses and fees with the clerks of the county courts. At present this is done by the Road Commission. The fee would remain unchanged. Authority to grant chauffeurs' licenses and bus permits would be given the clerks of courts. In the lower branch a bill has been presented which would require all bus lines operating wholly within the limits of a city or incorporated town to secure permits from local authorities. No operator could get an operating license without this permit. Under this bill the commission would have power to grant permits for periods up to ten years and to fix the amount of indemnity insurance or bonds. A levy on the Maryland seat-mile basis is embodied in the terms of this act. Gross weight of buses would be limited to 10,500 lb. and weight on any one wheel to 300 lb. per inch of tire width.

**Jersey Buses Must Stop Before Crossing Tracks.**—The Public Utilities Commission of New Jersey has issued an order that all drivers of motor buses in the state shall bring their cars to a full stop before crossing a railroad track at grade. The commission holds that these motor vehicles are common carriers and subject to all the regulations for safety.

**Montreal Buses to Be Taxed.**—According to the provisions of a by-law recently adopted by the City Council of Montreal, Que., all motor buses using the streets are subject to a yearly tax of \$50. Other clauses in this law call for a \$15 a year tax upon all owners of motor vehicles plying for hire and for the payment of a \$5 license fee for all drivers of such vehicles.

**Detroit Buses to Pay Mileage Tax.**—According to the provisions of a Detroit, Mich., ordinance, which went into effect on Jan. 5, all motor bus owners are required to file with the City Controller each month a verified report of mileage traveled by each bus and to pay a tax of 1 cent per mile. The measure as originally drafted called for a tax of 2 cents per mile, but was amended following protests by the Detroit Motor Bus Company.

# Personal Notes

## E. L. Bryant, Pioneer Minneapolis Operator

**Extensive System Built Up from Small Beginning—Progressive Methods and Faith in Future of Industry Secrets of Mr. Bryant's Success.**

FROM druggist to president of one of the leading bus systems in the Northwest in two jumps describes the recent business life of E. L. Bryant of Minneapolis, Minn., head of the Jefferson Highway Transportation Company. The intermediate jump landed him in the motor transportation business as the driver of a touring car bus and from that modest beginning Mr. Bryant developed a well equipped and extensive interurban bus transportation system that carries yearly more than 150,000 passengers.

For fifteen years E. L. Bryant was a druggist in Minneapolis. Then for two years he traveled for a dental supply concern, but disliked being away from his home so much. His next move was to drive a small bus of the touring car type on Nicollet Avenue seven years ago when the industry was in its infancy.

It was about this time Mr. Bryant conceived the idea of building a regular bus and this resulted in his operating the first large bus seen on the streets of Minneapolis. It had an inclosed body for sixteen passengers and was built by the Downham & Cammett Company for White chassis. At the end of two years he had four buses, borrowing money to procure them.

In 1918 the Minneapolis Street Railway bought up the buses for operation. From that time until 1920 Mr. Bryant was not in active business, but the germ of the bus idea persisted. In 1920 he started what is now the Jefferson Highway Transportation Company, in a small way, with only one bus, running 12 miles, to Osseo, Minn., a suburb.

Gradually Mr. Bryant has added to the fleet and extended the routes until the company has now \$300,000 authorized capital. It was started at \$50,000, and a small amount of stock was sold but expansion has been carried on mainly by turning the earnings back into the property. Later the line was extended to Mille Laes district, and to Aitkin, Minn. Other extensions were to St. Cloud and Little Falls, and a branch was established between St. Cloud and Willmar, Minn. Still another extension is planned for the coming spring.

In 1922 the Jefferson Company bought the Touring Car Bus Company, operating to Rochester, Minn. This line has

six cars and a run of 98 miles and is operated under its former name.

Including the Rochester line, Mr. Bryant's concern now operates twenty-six buses, which in 1922 carried 150,000 persons, covering 3,500 miles a day. There are thirty-three employees. The company builds its own bodies, has a two story garage, 60 ft. x 130 ft., with which is combined a paint shop and welding plant. The standard is twenty-passenger capacity sedan type on a White 50 chassis. The upholstery is



E. L. Bryant

blue velour, with all modern conveniences possible in a bus. Mr. Bryant believes this pays. The company colors are blue and white and the cars are entirely white above the bottom of the windows so that the buses may be easily distinguished on the road.

"The possibilities of bus transportation are unlimited," said Mr. Bryant. "The bus gives frequent service, a service right at the door of the ruralites, who realize that the bus means the building up and settling of territories that have never had adequate transportation service and were therefore held back. For instance, the Mille Laes territory never before had direct transportation to Minneapolis, and the bus saves the people five hours time and \$2.50 each way, and gives frequent service.

"Success of bus transportation depends on service at frequent intervals rather than on volume at any one time. Those who do not get the 10 o'clock bus take the 12 o'clock.

"Freight business retards the service, and requires extra space, so we carry only passengers and leave the freight to specialists in that line."

Mr. Bryant is president of the Minneapolis Motor Bus Terminal Company,

which occupies the Union Station, which was first operated by the Jefferson Company for eighteen months alone. Since the association was formed last spring nearly all the lines in the city radiate from this terminal.

Because of increased travel it is expected that a new terminal will be established in the spring. This plan has not yet taken definite shape, but when it does the new structure will be the last word in accommodation and appointments, so far as the means at command will permit.

## J. R. Bibbins Resigns as Chamber of Commerce Official

J. Rowland Bibbins, for the last two years connected with the United States Chamber of Commerce as manager of the transportation department, has resigned that post to engage in consulting engineering practice in transportation and its related problems.

Mr. Bibbins' work in Washington included a special study of the whole group of transport agencies and their relative status and possibilities of coordinated development, all in connection with legislation and public policy. Prior to his association with the Chamber of Commerce, Mr. Bibbins was connected with the Bion J. Arnold Engineering organization in Chicago as supervising engineer, a position which called for an intensive study of important transportation problems both in the United States and Canada.

Educated in Baltimore and the University of Michigan, Mr. Bibbins early acquired direct experience in electric and railway utilities in Detroit, and with manufacturing and power development in the Westinghouse companies as commercial engineer. He has been honored by various engineering associations and civic bodies in whose activities he has been an ardent and intelligent worker.

## Messrs. Moser and Wotton Join Chicago Motor Coach Company

Herbert C. Moser, superintendent of transportation of the Fifth Avenue Coach Company, New York City, has accepted the position of director of transportation for the Chicago Motor Coach Company. Mr. Moser has been connected with the Fifth Avenue Company since 1913, and has played a prominent part in shaping the policies and carrying on the operations of that system. He will enter upon his new duties about March 10.

J. W. Mullahey, who has been connected with the transportation department of the Fifth Avenue Company as division foreman, succeeds Mr. Moser as superintendent of transportation.

Edward Wotton has resigned as superintendent of equipment of the Fifth Avenue Coach Company and will join the Chicago Motor Coach Company as superintendent of equipment. Mr. Wotton is a pioneer in bus transportation, having been with the Fifth Avenue Company since 1906.

## Mr. Killeen Leaves Operating Field

H. H. England Succeeds W. P. Killeen  
as Manager of Washington Company  
—Mr. Killeen to Devote His Time to  
Private Business.

WHEN at the end of 1922 William P. Killeen had brought the costs of the Washington Rapid Transit Company's buses to 17 cents per mile, he felt that he could retire from the arduous duties of the active management of the company and devote more of his time to his other business interests. He consequently submitted his resignation from the active management of the company, while retaining his office of vice-president and his membership on the board of directors. It was with a great deal of regret that the resignation of Mr. Killeen was accepted by the directors of the company he had served so well.

In addition to being president of a local bank, Mr. Killeen is representative for the Duplex Truck Company. As the special representative of this concern, he plans to study the transportation situation throughout the East, with the idea of giving the advantage of his experience to those who are contemplating bus operations. Mr. Killeen will make a number of specialized studies at points where the need for traffic relief is particularly great. He realizes that the prestige of the bus as a medium of transportation has suffered to no small extent because of inexperience on the part of those engaged in this business. As a result, he is going forth equipped with full data as to cost accounting, methods of general bookkeeping, etc., prepared to advise prospective operators as to the type and number of buses which should be employed.

Mr. Killeen was born in Peoria, Ill. He was educated at St. Johns College in Washington and has lived in the capital city since an early age. His entire business career has been confined to specialization in short-haul transportation. His work in that specialty antedates the automotive vehicle.

His early activities were devoted largely to contracts for placing materials on the ground for railroad constructors. He had charge of the hauling for one of the largest construction companies in the country at the time of the outbreak of the war. In that capacity he superintended the local delivery of all materials which went into the extensive program of construction done for the Marine Corps at Paris Island, S. C., and for the entire cantonment construction in the Washington area. In this latter operation, he employed a fleet of 295 motor trucks. He commanded this great fleet throughout the war, during which entire period his principal was called upon to pay but \$7 for demurrage on cars not unloaded within the prescribed time.

Mr. Killeen was called into conference by the Washington authorities when the congestion on the street cars, during the war period, became so great as

to make it necessary to secure relief. When the street railway companies declined to operate buses on Sixteenth Street, one of the capital's main thoroughfares, on the ground that they could not afford to pay the deficits which would be incurred in bus operations, Mr. Killeen undertook the formation of a company to perform this service. The enterprise has been a very successful one and today the buses of that company are carrying close to 500,000 passengers monthly. Mr. Killeen was recently elected vice-president of the National Motor Transport Association.

Howard H. England, the new general manager, has been with the company since its inception in March, 1921. Prior to that time he was associated with Mr.



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W. P. Killeen

Killeen in the distribution of Duplex trucks in Washington and vicinity.

He is eminently qualified by experience and ability to carry on the extensive business built up by his predecessor. Ever since the first bus was operated over the company's lines, Mr. England has followed step by step the advance of the transportation company. Starting in as a checker, by his own efforts he rose to superintendent. Because of hard study and close attention to business, Mr. England assumes the management of the company, equipped with a fund of practical knowledge of bus operations and its intricate problems.

Mr. England, a native of Maryland, has been a resident of Washington for the past twelve years. His business career began with a clerkship in a local hardware store; later he was employed in a piano salesroom. Prior to the war he was on the sales force of the Lyndall Motor Truck Company. Then he went into the Duplex sales organization with Mr. Killeen, where the basis of his transportation experience was formed.

Mr. England is thirty years old and is married. He is extremely popular with his employees in the shop, in the office and on the road. "Howard," as he is known in the capital city, is a popular and an able executive with a well-rounded experience in the bus field.

## Mr. Kuhns Becomes Aberdeen Manager

J. D. Kuhns is the new manager of the Aberdeen, Wash., offices of the Tacoma, Olympia & Aberdeen Transportation Company. He succeeds W. S. Kennedy, who will devote his entire time to the Kay-Bee Stage Company.

William H. Connell, Philadelphia, has been appointed assistant highway commissioner of Pennsylvania, succeeding George H. Biles, who tendered his resignation to Commissioner Paul D. Wright on Jan. 30, to become effective March 1.

Frank L. Oberfield, formerly superintendent of transportation with the American Motor Truck Company, is now with the Ohio Motor Bus Company, Columbus, Ohio, in the capacity of superintendent in charge of transportation and maintenance.

Donald F. Hine has resigned from the editorial staff of BUS TRANSPORTATION and *Electric Railway Journal*. The recent death of his father made it seem to Mr. Hine to be necessary to return home and take up a part of his father's duties as general manager of Fishers Island Farms, Inc., Fishers Island, N. Y.

Merrill B. Knox has joined the editorial staff of BUS TRANSPORTATION and *Electric Railway Journal*. He comes to the McGraw-Hill Company from the Chicago Elevated Railroads, where, as student engineer for the past two years, he has worked in several departments of one of the leading railway operating organizations of the country, which has also been among the most progressive in taking up the bus. Mr. Knox will make his headquarters in the Chicago office of the McGraw-Hill Company. After graduation in 1920 from the Massachusetts Institute of Technology, department of mechanical engineering, Mr. Knox was for a short time employed as designer in the gas power engineering department of the International Harvester Company, leaving this position to enter the railway field. He received his early education in the public grade schools and the R. T. Crane Technical High School of Chicago, later continuing a junior college course at Crane. After Mr. Knox was graduated from the Crane School and previous to matriculating at "Boston Tech" he was employed in the signal department of the Chicago & Northwestern Railway. During the war Mr. Knox served as seaman, second class, U.S.N.R.F., stationed at Boston. He was born in Goshen, Ind., Nov. 17, 1896.

## Obituary

Col. William D. Uhler, state highway engineer of Pennsylvania, died recently at his home in Harrisburg, following an apoplectic stroke. He was an engineer of high attainment and rendered invaluable service not only to the people in his own state, but to the country at large.

# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



Market conditions  
affecting the bus  
industry.  
Price changes in  
important  
commodities.

## With the Tire Makers

**Akron Reports Enormous Production—  
Tire Men Figure on 50,000 Buses in  
Operation by Mid-Summer.**

**B**USINESS on all classes of tires is greater now than it has ever been in the history of the industry. Labor costs are being rapidly boosted by the payment of bonuses to workers of every type and raw material prices continue to advance. It is impossible, however, definitely to predict the date or extent of the next price advance. There seems to be little doubt that such an advance is forthcoming.

The next two months will probably find the industry sending out reports of a shortage of tires. In fact, these reports are already beginning to be heard in the higher rubber circles, but there is no reason to believe that the coming summer will actually witness a tire shortage.

Inability to obtain sufficient men and transportation difficulties may make impossible the shipment of tires as rapidly as might be desired, but an analysis of the situation makes for the opinion that while production will probably be larger than at any previous time, the demand for tires will be met.

The entire industry at the present time is absorbed in measures to increase production. The four largest rubber companies have inaugurated the bonus system for employees to speed up production and plans are being made to recall as many of the rubber workers who left Akron with good records as possible.

Bus experts connected with the rubber companies are preparing their production schedules based upon a total of 50,000 buses in operation by the middle of the summer. The estimates on the part of different bus experts vary somewhat. Some place the number in operation higher and some lower than 50,000 by July, but this is the average mark by which tire producers will be guided during the next few months.

Goodyear announces that its smaller diameter tire is finding increased favor among bus manufacturers and that while the process of introducing the new type of tire is necessarily slow the indications now point to a large use of this tire within the next year or so. Similar information is given out by some of the other factories which are making the new type of tire.

Some of the manufacturers also report increased sales to bus owners of the semi-pneumatic or cushion tires. There is not a distinct trend in this direction, but a sufficiently large number of bus owners is using this newer tire

to make it worthy of mention. This is the opinion expressed by some of the large tire manufacturers.

The Lambert Tire & Rubber Company, which makes a patented solid tire, also reports that its tire is being used more widely in bus service, especially by owners who operate in territories where roads are bad in places and in hot climates where pneumatic tires deteriorate because of the intense heat.

During the present year there does not seem to be much possibility of any extensive development of new ideas in bus tires. It seems now that the industry will confine itself to the production of existing types without spending much money or energy in producing new models.

## Gasoline Prices Advance

A comparison of the gasoline prices shown in the accompanying table with those in effect Jan. 29, published in the February issue, shows a general advance ranging from 1 to 2 cents per gallon. Exceptions to this upward movement are noted in the Pacific Coast section, where the price remains the same as last month, and in Omaha and St. Paul, where a 1 cent per gallon drop in price occurred.

The Standard Oil Company of New York, announced an advance of 1½ cents per gallon, making the price 24½ cents for tank wagon gasoline in its territory, New York and the New England States.

This increase, made on Feb. 26, is not included in the figures shown in the following tabulation, which is of Feb. 24.

## Gasoline Prices—Feb. 24, 1923

City	Cents Tank Wagon	Per Gal. Service Station
Albany, N. Y.	22	24
Atlanta, Ga.	21	23
Boston, Mass.	23	25
Chicago, Ill.	20	22
Cincinnati	21	23
Detroit, Mich.	21 1/4	23 1/4
Fort Worth, Tex.	18	21
Indianapolis, Ind.	20 1/8	22 1/8
Jacksonville, Fla.	19	21
Kansas City, Mo.	17 1/2	19 1/2
Louisville, Ky.	20	22
Memphis, Tenn.	18	20
Milwaukee, Wis.	20 1/2	22 1/2
Mobile, Ala.	18	20
Newark, N. J.	23	25
New Haven, Conn.	23	25
New Orleans, La.	18 1/2	20 1/2
New York, N. Y.	23	25
Oklahoma City, Okla.	17	20
Omaha, Neb.	20 25	22 25
Philadelphia, Pa.	23	26
Pittsburgh, Pa.	23	26
Richmond, Va.	23	25
St. Louis, Mo.	20 5	22 5
St. Paul, Minn.	20 7	22 7
Salt Lake City, Utah	22 5	24 5
San Francisco, Calif.	17	20
Seattle, Wash.	19	22
Spokane, Wash.	22 5	25 5
Washington, D. C.	23	25

## Conditions in the Steel Industry Reviewed

Since the first of the year the trend of steel prices has been steadily upward. Purchases at today's prices carry no definite promise regarding shipping date and on some orders it is said that premiums have been paid for prompt acceptance of contracts. Aspects of the present situation in the iron and steel business, the *Iron Trade Review* in a recent article said:

"The steel industry is in a position of unusual strength. The demand for steel is increasing rapidly and the supply is being increased correspondingly. The industry is well equipped to meet the demand and is in a position to expand its production if necessary. The steel industry is in a position of unusual strength. The demand for steel is increasing rapidly and the supply is being increased correspondingly. The industry is well equipped to meet the demand and is in a position to expand its production if necessary."

## Gasoline Tax Would Bring \$10,000,000

Forty million dollars annually can be raised for road building and maintenance by a tax of 1 cent a gallon on gasoline, according to a statement made recently by Thomas H. MacDonald, chief of the Bureau of Public Roads of the United States Department of Agriculture, in urging a readjustment of sources of revenue so that a larger proportion will be paid by the road user and a lesser percentage from State or local taxes. This method of raising funds has been adopted in Arizona, Arkansas, Colorado, Connecticut, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Montana, New Mexico, North Carolina, Oregon, Pennsylvania, South Carolina, South Dakota and Washington.

## Tire Executive Predicts Vast Bus Expansion

That the next five years will see as many buses in operation as there are now automobiles in use in the United States is the prediction of Frank A. Seiberling, president of the Seiberling Rubber Company, Akron, Ohio, and formerly president of the Goodyear Tire & Rubber Company.

Mr. Seiberling is showing his confidence in the future of the industry in seeing that his engineers are constantly working out plans for new bus tires and his entire organization is making plans to pay more attention to this phase of the business than ever before.

The development of the "All Tread" tire, which was placed on the market several weeks ago, is just the first step in the direction of specializing in bus and truck tires, according to semi-official announcements by the company.

Mr. Seiberling foresaw the present development of the bus business and eight years ago prepared for it for the Goodyear Tire & Rubber Company, of which he was then president, by placing experimental buses in operation.



## Rolling Stock

Fred Piper, Irving, Kan., is in the market for a modern twelve-passenger bus.

Boylevard Transit Company, Sioux City, Ia., has purchased two White buses, Model 50 chassis.

British Columbia Electric Railway, Vancouver, B. C., has contracted for two White bus chassis.

Howard Ashell, Moberly, Mo., has purchased a Packard bus for use on the Huntsville-Salisbury line.

Jefferson Highway Transportation Company, Minneapolis, Minn., has purchased six twenty-passenger White buses.

E. J. Dorey, White Bus Line, Binghamton, N. Y., has ordered a snow plow from R. F. Hawley, Binghamton.

Frank Kern, Rochester, Ind., plans the purchase of an eighteen-passenger bus for the South Bend-Fort Wayne service.

Gray Motor Stage Lines, Janesville, Wis., has placed in operation a new Fageol bus over its Janesville-Watertown line.

Smith Bus Line, operating between Aurora, Elgin and Big Rock, Ill., has purchased nine thirty-passenger Selden buses.

Groton & Stonington Railway, Norwich, Conn., has added to its equipment two twenty-nine-passenger Fageol buses of the city type.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has added two Fageol buses of the Inter-City model to its motor equipment.

Frank Hungerford, owner of the Albany-Slingerland, N. Y., line, has bought a 10-ton tractor and snow plow for use in keeping his line open.

Dayton, Hamilton & Cincinnati Rapid Transit Company contemplates the purchase of four additional twenty-passenger buses for its Oakley, Ohio, line.

Ultimate Bus Company, Wheeling, W. Va., has ordered four new buses for use in Wheeling and intercity routes.

The Continental Coach Company, Camden, N. J., recently purchased two twenty-two passenger Intercity model Fageol buses.

The School Department, New Bedford, Mass., recently acquired a thirty-passenger bus, equipped with a Wayne body mounted upon a Red Speed Wagon chassis.

Cincinnati Motor Bus Company, operating from Cincinnati to Norwood, Ohio, has replaced its six solid tired buses with a like number of pneumatic tired Ace buses.

City Council, Los Angeles, Calif., has awarded to the Moreland Sales Corporation the contract for two buses to be operated over the Griffith Park municipal line.

Butler-Newark Bus Line, Inc., Newark, N. J., will increase its equipment by the addition of four twenty-nine-passenger buses, manufactured by the American Motor Truck Company.

Packard De Luxe Motor Bus Company, which plans to operate between Chicago and St. Louis, announces the delivery of two Packard buses. Twenty more are promised for April 1 delivery.

Youngstown (Ohio) Municipal Railway has contracted for eleven new buses for operation on city lines. The bodies are constructed by the Bender Company and the chassis by the White Company.

Clarence C. Goodman, Springfield, Mass., has purchased a twenty-two passenger bus from the Springfield Motor Corporation. The body was constructed by the Paterson Vehicle Company and is mounted upon a Stewart chassis.

Peeckskill-Brewster Bus Line recently installed an Ace Model C motor bus for operation over its route between Peeckskill and Brewster, N. Y. This operation is owned and managed by Henry J. O'Meara of Lake Mahopac.

Puget Sound International Railway & Power Company, Everett, Wash., has placed an order for three additional Fageol coaches of the street car type, to augment the fleet with which it is gradually replacing its traction system.

Borden Bus Line, Inc., Decatur, Ill., has contracted for two twenty-five passenger Garford buses, one of which is now being built at the Garford factory. The other will be delivered in the spring for use on West Decatur routes.

Washington Railway & Electric Company, Washington, D. C., has received authorization from the Public Utilities Commission to operate twenty passenger buses, built upon Dodge-Graham chassis.

This company has purchased two new Hoover bodies.

Detroit Motor Bus Company, Detroit, Mich., has placed orders with the Fifth Avenue Coach Company, New York, N. Y., for fifty-six sixty-passenger double-deck buses and twenty-four twenty-nine-passenger single deckers. These buses will be used in city service.

C. W. Gordon Company, dealing in investment securities in several Pacific Coast cities, has purchased a specially built combined traveling private office and club coach, for use in transporting prospective purchasers. This vehicle, which carries thirteen passengers, is built on the Fageol chassis.

Pacific Electric Railway and Los Angeles Railway Companies have placed an order with the White Company for eighty Model 50 chassis. Bodies will be built in the Pacific Railway's shops. These buses will supplement the city and interurban service furnished by the two railways in southern California.

Ohio & Kentucky Transportation Company, Ironton, Ohio, has purchased one White model 50 chassis and one Denby chassis, both equipped with bodies built by the Cynthiana Carriage Company, Covington, Ky. This company, of which R. H. McGugin, Ironton, Ohio, is secretary and general manager, plans to buy another bus in the near future.

## Shops and Garages

Puget Sound International Railway announces that in future, bodies for buses operated in Everett (Wash.) by the railway as a part of its motorization plan, will be built in the company's shops in Everett. The company recently received two new chassis from Oakland auto shops, for which bodies similar to those now in use will be built.

## Business Notes

C. J. Cassese, formerly assistant sales manager and acting general sales manager of the Four Wheel Drive Auto Company, was recently made general sales manager for that company.

J. J. Shea is the new treasurer of the Firestone Tire & Rubber Company, Akron, Ohio, succeeding J. G. Robertson, who becomes the executive in charge of all subsidiary operations of the company.

President Myron E. Forbes of The Pierce-Arrow Motor Car Company announces that a production schedule has been adopted for the year which calls for a doubled output of Pierce-Arrow trucks during 1923.

The General Motors Corporation has acquired the body plant of the Milburn Wagon Works at Toledo, Ohio, for \$2,000,000, and it is understood will use the property as a new body-building unit.

O. M. Edwards Company, Inc., Syracuse, N. Y., has made Edward F. Chaffee a vice-president of the company. Mr. Chaffee has been manager of the railroad department for the past twelve years.

American Engineering Company, Philadelphia, Pa., has taken over the Standard Crane & Hoist Company and the patent and manufacturing rights to the mono-rail electric hoist formerly known as the Standard.

Globe Ticket Company, Philadelphia, Pa., has opened a branch factory at 120 South San Pedro Street, Los Angeles, Calif. C. M. MacAllister, formerly connected with the Philadelphia office, has charge of the Coast factory.

The DeJon Electric Corporation, a Delaware corporation, with general offices and plant at Poughkeepsie, N. Y., has leased the Poughkeepsie plant of the Electric Auto Lite Company and has purchased all of its machinery and equipment.

Moie Cook, formerly of the Service Motor Truck Company, Wabash, Ind., has acquired a substantial interest in the business of the Indiana Truck Corporation, Marion, Ind., where his work will be along executive and managerial lines.

Mutual Truck Company, Sullivan, Ind., will begin soon to turn out motor bus bodies in addition to manufacturing trucks and truck bodies. Recently the company took over the machinery and business of the Sullivan Baler & Manufacturing Company.

M. S. Bottume, former secretary and sales manager of C. Cowles & Company,

New Haven, Conn., has become vice-president of Joseph N. Smith & Company, Detroit, Mich., builders of automotive hardware. Mr. Bottume will be in charge of sales.

Fred H. Chesnut has resigned from the White Company, where he held the position of transportation engineer for the Pacific Coast district with headquarters in San Francisco to become vice-president of the Anderson-Endebrock, Inc., Pacific Coast distributors of Trailmobiles.

William N. Shaw, who has been president of the Eisemann Magneto Corporation, Brooklyn, N. Y., for the last four years, also vice-president of the New York Air Brake Company since 1916, has resigned the latter office in order to devote his entire time and attention to the interests of the Eisemann Corporation.

Standard Parts Company stockholders at a recent meeting held in Cleveland, Ohio, drafted plans for a re-organization of the company, which is now in the hands of a receiver. These plans propose the formation of a new company, which would have a capitalization of \$2,500,000 of preferred stock and \$6,000,000 of common stock.

Rhoda Body & Manufacturing Company, Lima, Ohio, has made arrangements for the construction of a new one-story all steel structure to be erected at a cost of approximately \$30,000. Increased business is given as the reason for the company leaving its present quarters in the Rhoda Brothers building on South Union Street, Lima, Ohio.

Kennedy Engineering Company, New York, N. Y., has completed a series of bus designs, incorporating the elements of the trolley bus, semi-tractor and self-propelled vehicle. No arrangements for the taking over of these designs have yet been made. W. P. Kennedy is president and Arthur J. Slade vice-president of the company.

Parker Appliance Company, Superior Viaduct and Vermont Avenue, Cleveland, Ohio, is in the market for spindle automatic screw machines with a capacity for 3-in. stock to be used in the manufacture of Die-form tube couplings. Several adjustable multiple-spindle drilling machines will also be installed, also a number of hand screw machines principally of the No. 2 size.

H. L. Hurst, who has been assistant general manager of the General Motors Truck Company, Pontiac, Mich., has been elected vice-president of the company. In his new position Mr. Hurst will be the second officer in charge at the factory, while O. E. Stoll, manager of the New York branch and a vice-president of the company, will continue in charge of the Eastern territory.

The Curtain Supply Company has moved into its new quarters at Elkhart, Ind., where a modern one-story concrete and steel building has been erected. The general offices of the company will be in Elkhart, where T. W. Holt, general manager, will have charge. A Chicago office will be maintained to look after remittances and financial correspondence. The general correspondence and orders will be handled at the Elkhart offices.

The Maccar Company, Scranton, Pa., manufacturer of motor trucks, announces that R. C. H. Rupp has been elected president of the company to succeed A. B. Warman, who becomes chairman of the board of directors; also that W. D. Woodworth, formerly of the Packard Motor Car Company and for many years general manager of the Wood Hydraulic Hoist & Body Company, has been elected vice-president and general manager of the company, and that C. A. Weymouth has been appointed director of sales.

Arthur M. Laycock, 110 West Forty-Second Street, New York, N. Y., has been appointed New York representative of the Detroit Steel Products Company, Detroit, Mich., and also will represent the Waukesha Motor Company in the East. For eleven years, Mr. Laycock served as chief engineer for the Sheldon Axle & Spring Company. During the war he was general manager of the Fifth Avenue Coach Company. He has also been identified with the London Omnibus Company and the English Daimler Company.

Pierce Arrow Motor Car Company stockholders, at a special meeting held in Buffalo, N. Y., on Feb. 19, agreed upon a plan for financing the company's floating debt. This program was proposed by the directors and includes the sale and issue of \$3,500,000 one-year 6 per cent secured notes, the creation of an issue of \$6,000,000 first mortgage bonds, \$1,200,000 8 per cent debentures and 15,750 shares of preferred stock and 78,750 shares of additional common stock. The bank loans which are to be liquidated under this plan amount to about \$7,150,000.





New York, April, 1923

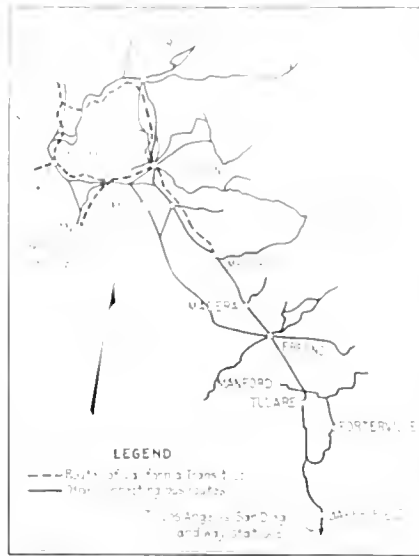
# Maintaining Stages on a Large Western System

## California Transit Company Operates 250,000 Stage-Miles per Month Chiefly on Long Runs—Makes Axles, Hubs, Whistles, Etc., but Finds Tire Retreading Uneconomical

**M**AINTENANCE problems on a Western stage system are widely diversified, but they always call for a goodly share of originality because the man in charge will have to design and manufacture to meet special requirements, and in emergencies he must find his way out of difficulties without the aid of consultation with factory experts. The California Transit Company, operating in central California, is no exception to this rule. With seventy to ninety cars operating an average of 250,000 car-miles per month over all kinds and conditions of roads it is one of the largest, if not the largest, Western system operating stages as distinct from buses. Cars of this company have wheelbases up to 236 in. and carry fourteen to twenty-seven passengers in seats entered by side doors.

The system includes the network of routes covered by some sixteen independent lines which were consolidated in 1921 by Wallace E. Travis to form the California Transit Company. At that time all old rolling stock was sold and the system was standardized on White chassis, a well-equipped maintenance shop was built and an efficient organization was developed along the substantial line for which Mr. Travis has a reputation extending back into the days of the horse-drawn stagecoach.

The maintenance department headquarters in Oakland is a one-story concrete structure with 15,000 sq.ft. of floor space divided into office, stock room, tire department, electrical and carburetor department, designing



*Route map of the California  
Transit Company*

room and the main "shop," in which space is set aside and equipped for machine work, dismantling, overhauling, painting, storage, etc. The shop is in charge of A. T. Shere, superintendent of maintenance.

Cars are maintained on the unit system; that is, motor, clutch, transmission, rear end, brakes, etc., are each considered separate units. Repairs are seldom made on units in service; when a car comes in with some unit needing attention an expert, who works on one or more of these units exclusively, tests it, and if adjustment cannot be made quickly the unit is removed bodily and another substituted. A new differential or transmission, for example, can be substituted in three hours. Of the cars owned by this company 75 per cent are used in service constantly and about 25 per cent are spares except in summer, when the travel reaches its peak. The summer schedules call for an average of 5,000 miles per month per car.

Five extra motors complete are kept on hand and a motor change is

Indexed Cards in Each Department Record Performance Accurately with Minimum of Bookkeeping — The Company Maintains a Weekly "School" at Noon for the Shop Men

ordinarily made in about eight hours. These extra units are mounted on stands supported on castors so they can be quickly moved under the overhead rail. The rail carriage has a chain block, with which one man can lift the motor and deliver it to place in a chassis. When the inspectors order a motor out of service for overhaul it is lifted out of the chassis by one man with the aid of a crane and taken to the wash rack, where it is thoroughly cleaned. As it is dismantled all parts are placed in a metal-bound box 1 ft. square and 16 in. deep. This box is mounted on castors and can be rolled to the motor department, where the engine base is placed in a motor stand for assembly. The box is placed under the bench out of the way and parts are picked out as needed. The number of the car from which the motor is taken is marked on the box and thus overhauling time is charged to the car which used the motor.

A device for centering and holding connecting rods while boring new bearings has been developed by Mr. Shore and is shown in one of the accompanying illustrations. With this machine four connecting rods are bored and the whole operation, including scraping by hand, is finished in six hours, an operation that previously required four days. The machine cuts to within 0.001 in., after which the hand finish is made. It consists of a heavy frame for supporting the connecting rod firmly and with means of accurately centering the upper bearing. A tubular section at the base contains a thread

for a long shaft which carries a single cutting tooth and a hand wheel. The long bearing keeps the shaft accurately centered and once adjusted the boring is done quickly.

Two men, experts especially trained for this work, do all motor overhauling required on the entire fleet. Reconstruction on differential, transmission, steering gear and on pumps for oil and water is all done by another man who works in the same department. On many of the minor operations, because of the exigencies and heavy duty required in stage service, the policy is to renew rather than to repair where the new part will cost but little more. Before installing a new motor it is operated

cially heavy section, the diameters of the old and new axle at this point being  $1\frac{1}{8}$  and  $2\frac{1}{8}$  in. respectively; an idea of the other dimensions may be gained from the accompanying illustration and the fact that the new axle weighs 24 lb., as against 18 lb. for the factory design. (2) The new axle permits the use of larger bearings, and (3) puts the bearings on the axle itself instead of on the hub. This latter feature not only gives space for larger bearings and larger axle without exceeding any of the housing limitations, but it makes it possible to "pull" a rear wheel without disturbing axle and bearing.

In building new chassis this com-

shafts, for which purpose the material is well suited.

Bronze bearings, bushings and many other small parts are also made by the company, the castings being made in local foundries, according to specifications, and the machining and finishing being done in the company's own shop. In many cases the cost of this method is much lower than for parts bought from an Eastern factory. One part that cost \$7 as delivered from the East is made for \$2.63, including 20 per cent for overhead. Another item, on which the Eastern factory quotations is \$1.14, is made in the shop for 32 cents.

All cars are greased and oiled on a mileage basis. Each car carries in



for eight hours on the "running-in" stand. This gives the equivalent of several hundred miles of service and the motor is ready for the road when placed in the chassis.

#### PARTS OF SPECIAL DESIGN

Early in the operations of this company it was realized that heavier rear axles were needed. The expense entailed in breaking a rear axle on a stage in service was excessive as compared to the cost of any type of axle that might be designed. The breaking of rear axles in service, however, has now been entirely eliminated by the adoption of a new rear axle design, heavier than anything heretofore used on this system.

The design as worked out by Mr. Shere, using hot rolled, chrome-vanadium, heat-treated steel, can be fitted in the standard rear end without any changes in housing or differential. The points of advantage over the standard axle are: (1) The new design is stronger in all sections and at the point where breaks were found to occur most frequently has a spe-

#### A stage of the California Transit fleet

This latest addition to the fleet is typical in size and style. Its new departures include dual rear tires and extensive baggage capacity on the roof.

pany never allows the drive shaft to have an unsupported length greater than 5 ft. On most of the stages this necessitates two drive shaft center bearings. The California Transit Company has found it economical to manufacture its own bearing housings for this purpose and in so doing has changed the design in several particulars. For example, as made by the factory the bearing has six bolts, four  $\frac{1}{2}$  in. and two  $\frac{3}{4}$  in. in diameter. As built in the Oakland shop all requirements are fulfilled by two  $\frac{3}{4}$ -in. bolts.

The drive shafts also are made up in the company's shops out of seamless steel tubing bought in long lengths and cut as needed. When transmission and differential pinion shafts are worn out in the splines they are not scrapped, but are put in salvage and are most often remachined into stub-ends for drive

a celluloid pocket, beside the driver's seat, an oil and grease card, size 3 x 10 in., on which entries are made under ten classifications. Five of these, A to G inclusive, refer to various units of the chassis that require lubrication at different times. Column A, for example, refers to all parts that require greasing every 250 miles. B is for parts to be greased every 500 miles, column C refers to crankcase oil, which is changed every 1,000 miles. Records are made in these columns by the greasers as they perform the greasing service indicated. Time clock records made on the card itself show the time the greaser consumed in each operation.

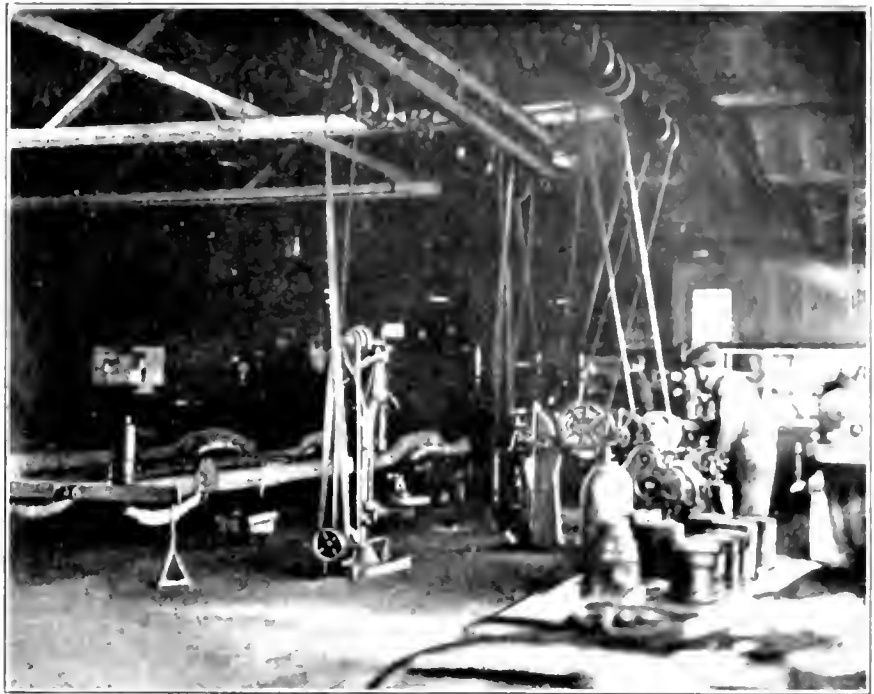
Other columns filled in daily by the driver give miles traveled during the day and gallons of gasoline and oil used. At the end of each month the mileage per gallon is compared with the driver's way bills to check any discrepancies in mileages reported. This system, particularly the plan of keeping the grease cards in each car, was worked out to insure proper lubrication regardless of what

point on the system the cars were stored between runs.

Brake lining has been a costly item in the maintenance budget and attention has been concentrated on this subject. To date, however, the ideal brake lining has not been found. Some linings that were very satisfactory in wet weather were not good in dry weather. The soft linings wear out rapidly and the hard ones wear the brake drum; the lining that glazes does neither, but will not stop the car.

The search is still being continued in the hope that the happy medium will some time be found. Meantime, two men are assigned to brake work constantly and when not actually adjusting or installing are kept employed lining interior and exterior brake bands so there will always be a supply on hand ready to be put on. Either of these men can "pull" a rear wheel and renew an inside brake lining in about thirty minutes. A factor in this short time for the operation is the convenient form of rear axle already mentioned in this article.

A sub-maintenance shop at Stockton, 87 miles from Oakland, and now centrally located to several routes on the system, is operated by about twelve men. These men do service work and make slight repairs that save sending cars in to Oakland headquarters. The daily tire and battery reports from Stockton and San Francisco come in to Oakland headquarters in the garage mail sack that goes each way twice a day on the stages.



*A corner of the California Transit shop*

At the left two new chassis frames are being prepared for a low body stage of new design.

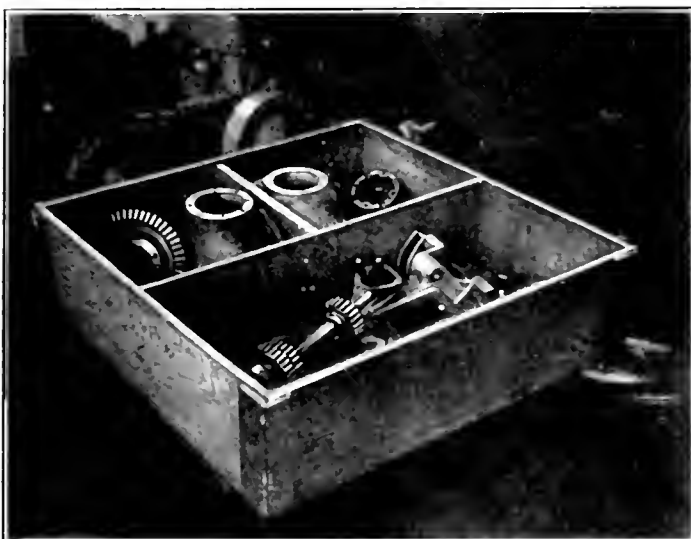
Two service cars are kept loaded with a "dolly" and a few essential spare parts ready for immediate service. One is stationed at Oakland and one at Stockton.

#### TIRE DEPARTMENT

Samson cord tires are used exclusively on the fleet and average 10,000 miles before they are ordered out of service; several instances of continuous service for 25,000 miles are on record. The tire pressures carried are as follows:

34½ station wagon	35 lb.
34½ oversize	100 lb.
34½ fronts	100 lb.
34½ rears	110 lb.
36½ fronts	110 lb.
36½ rears	125 lb.

Tire pressures are tested by the inspectors on each wheel and spares as the car comes in from a run, and if there is indication that the driver has been careless he receives a "notice of tire abuse," after which he must get a clearance from the operating department before he is again permitted to take out a stage.



*Box for parts used in dismantling*

For motor parts a box without partitions is used. Transmission and rear-end boxes are partitioned as in this illustration. The corners are protected with iron and the boxes mounted on casters.



*Device for speeding up recharging of connecting rods*

Note the capstan loaded set screws for centering, both above and below. Turning set screws to the right or left, as shown on top of the horizontal shaft.

Tire abuse consists in running with tire flat, loose on wheel, out of line or with more than one tire below pressure, indicating that pressures have not been tested. In "notices of abuse" covering under-inflation the air pressure for all four wheels and the two spares is entered on the notice. This impresses the driver with the close check kept on the equipment with which he is intrusted and tends to make him careful.

When a new tire comes into the stock room it is branded with a serial number and is listed on the

ket were too expensive and several makes that were tried literally shook to pieces or required frequent adjustment.

The whistle finally adopted was invented by Mr. Shere and built in the company's shops. It is a three-tone whistle, costing less than \$4 complete, which gives a clear, loud tone and on which maintenance cost is said to be negligible. Because all the whistles sound alike the cars of the system have come to be known by the whistle.

The chief feature of the design

shaft is placed in a groove on top of the casting and the vane may thus be swung down into the rectangular passageway. When the front end of the vane is tilted down the exhaust is diverted into the whistle pipe. The whistle proper, which is mounted on the valve casting, consists of three pieces of 1-in. steel tubing of different lengths welded together. With this arrangement, to remove a cutout valve, it is only necessary to take off the four bolts that fasten the pipe flange, after which the vane and shaft can be removed. However, the construction and operation are so simple that replacement is rarely required.

The heater is also built in the shop and consists of 12 ft. of seamless steel tubing, of which 6 ft. is in the forward compartment and 6 ft. in the rear or smoking compartment. In both compartments the heating element is a "coil" of the tubing placed under a seat. Standard pipe and fittings complete the circuit between the heaters and the exhaust line.

#### BATTERY MAINTENANCE

Batteries are assembled at the Oakland shop, branded with "C.T." and a serial number which identifies the battery for record purposes. Only one man is assigned to the electrical department, and here, as in all other departments, records are kept in card form showing the service and maintenance history of each piece of equipment.

Battery records are kept on 3x10-in. cards ruled in four columns. One of these cards is made out for each battery as it is put in service and the four columns then show successively the numbers of the stage to which a battery was assigned, the date on which it left the shop, the driver who took it out and the date on which it came back. If any repairs are made the date and cost are entered on a space at the top of the card.

The battery man goes through his card index every three days and checks the drivers who have batteries on the cars not equipped with generators. The driver of such a car is responsible for bringing his battery in for recharge every three days, and if he fails to do so the check of the battery records brings him notice of his delinquency. Batteries on cars with generators are tested by the battery man twice a month.

The electric department has a mercury arc rectifier magnet for



*Side view of the maintenance shop in Oakland*

master card index. Each driver turns in a daily report showing what tires, if any, were changed on the road, or were taken from or delivered to other stages or tire depots. Eight tire depots distributed over the system carry spare tires to which the drivers have access. These depots make daily reports to the main office and thus give a means of checking that would show any error or false entry. With the simple forms used the tire department records, kept by one man who has charge of the department, show a monthly mileage total for each tire. Thus without the overhead entailed by a bookkeeping system the records show which runs the mileage was made on and give a close check on tire service.

When the tread of tire casings is worn down to the breaker strip they are taken out of service and sold for junk. Retreading has not been found economical and has been discontinued. Inner tubes, however, are repaired as long as the rubber of the tube shows life. Repaired tubes are never put in new casings.

#### DEVELOPING A WHISTLE

Considerable experimenting was required to develop a warning signal suitable for stage service and which would not require excessive maintenance. Some of those on the mar-

developed is a combination heater and whistle valve consisting of a single casting through which there is a square passageway, 1½x2 in. in cross section. The square passageway simplifies manufacture and makes it easy to fit with a rectangular vane. The casting weighs 5 lb., the metal being ¾ in. thick, with two longitudinal ribs on the bottom to give it strength.

The two valves are placed in tan-



*The old and the new rear axle*

Larger axle, designed and built by California Transit Company, has eliminated rear axle breakage. It weighs 24 lb., as compared to 18 lb. standard design.

dem with the whistle valve ahead of the heater. Standard pipe floor flanges are bolted to front and rear ends of the casting so it can be inserted in the exhaust line and similar standard fittings are used on two apertures in the top of the casting by which the heater and the whistle pipes respectively are attached.

The same type of valve is used for both cutouts and consists of a 1½x3-in. vane, at one end of which is welded an operating shaft. The

battery charging and all necessary tools for maintenance on generators, starters and other electrical equipment. Extra cars and those on certain runs carry only batteries. Cars on through runs and those constantly in service use generators arranged to charge the batteries. The new model Ford generator has been adopted as standard for the fleet.

### STOCK ROOM

The stock room in the Oakland shop usually has on hand material and tools that total in value about \$30,000. The window to which workmen come for tools has a central location and the items in demand most frequently are placed nearest the window. The usual bin system of storage is used with tiers back to back and an aisle is left along the far wall where lengths of wire, tubing, etc., can be conveniently measured off.

Tools are taken from the stock room in exchange for brass tags, of which five are issued to each workman on employment. These tags all have to be turned in before a man receives his final pay on leaving the company.

All tools are listed on a board just inside the stock room window; the name of each tool being written on a metal-rimmed cardboard tag, tacked on the board and then shellacked. Beneath each listed item is a nail on which the brass tag of the workman is hung when the tool is delivered to him. No record of date of delivery is made, but if tags remain on the board more than one day the stock room attendant makes inquiry about them. An unusual number of special tools are to be found in the stock room. A new tool is made as often as a workman can show that an operation, often repeated in the process of maintenance, can be speeded up by a tool specially adapted to the purpose.

Painting car bodies by the air brush system has recently been adopted by this company, but there has not yet been time to observe wearing qualities of the paint so applied. However, as a time saver and in reducing the time that stages must be out of service, the method has much in its favor. These advantages are not only because it is applied so quickly, but because it dries so rapidly that all three coats usually used can be applied within an eight-hour period. Even the numbers and other special work are done with a spray through stencils.

The importance of keeping skilled labor happy has not been overlooked. Where the highest union wage scale is 74 cents per hour, the men in this shop are paid 80 cents per hour. The work is so laid out that while every one is kept busy the work is not rushed beyond the point where reasonable time is allowed. About thirty men on day shift and five men at night (greasing and service) do all the major maintenance and service work of the fleet. The labor turnover is extremely low; it is seldom that a man leaves the company's employ of his own accord.

### EMPLOYEES' SCHOOL

A feature of relationship with employees is the once-a-week school. This is held in the designing room at one corner of the shop from 12:45 to 1:30 p.m., thus taking fifteen minutes of the men's time and thirty minutes of the employer's time. Every one, from the office men to greasers, attends these lectures.

Most of this forty-five minute period is devoted to a talk by the superintendent illustrated with black-board sketches; time is always afforded for questions and answers. Often the leader will refer a question to one of the men to answer or may question them on the subject covered at the previous meeting. Each period is confined to one subject; some of those covered are bearings, steering gear, clutch, brake adjustments, shop efficiency, etc.

The entire shop force is organized as a fire-fighting crew, made up of squads of four men each. Each squad is assigned to a portable extinguisher, conveniently placed, and when the alarm sounds the man who reaches the extinguisher first takes it in charge. The alarm is a siren on the compressed air reservoir and is never used except for fire or fire drill. The shop is divided into three bays and the siren is made to give one, two or three blasts to indicate in which bay the fire has been discovered.

Fire drills are held every few weeks and there is much rivalry in each squad to see who can first report to the "fire chief" with the extinguisher assigned to his squad. Fire drills show that ordinarily at least a dozen men equipped to fight fire will be on the scene in less than ten seconds after the alarm sounds. It is the duty of the stock room attendant to ring in an alarm to the city fire department and of the office staff to telephone the fire department

whenever the alarm sounds, unless previously advised by the foreman that a fire drill is to be held.

New drivers are employed by the operating department after being examined as to character, personality, credentials, etc., but are subject to an examination by the maintenance department before being authorized to take a stage stage. This consists of a thorough road and drag test of handling a car in traffic, as well as a "figure eight" test.

Each driver is given a card and set of keys to be kept in the same car until he leaves. Except in emergency a car is never permitted to make an emergency or ad hoc adjustment on the road. On coming in from a run a "driver's trouble report" is made out in triplicate, always required of each driver to report the condition of the car. Before a car goes out on a run driver and inspector both sign a "garage check-off" stating that they have tested and found serviceable steering, gears, motor, brakes, lights and speedometer.

### COST RECORD

From the data kept on cards in the several departments a monthly "dope sheet" is made up giving cost of operations under nineteen classifications and figuring the cost per car mile to the fifth decimal place on each item and also on totals. The nineteen classifications are as follows:

Engine	Oil	Grease
Radiator	Water	Brake fluid
Motor	Clutch	Other parts
Steering gear	Brakes	Wheels & tires
Clutch	Brakes	Oil & grease
Transmission	Brakes	Brake linings
Brake linings	Brakes	Brake shoes

From this monthly sheet the cause of any excessive maintenance cost is at once apparent. Companion sheets give a more detailed analysis of each classification. It is interesting to note that of these items the most costly is motors, the second is bodies and the third is brakes.

## Newly Discovered Motor Fuel Impervious to Cold

PRESS reports from Alberta, Canada, state that Prof. Charles A. Robb of the University of Alberta has concocted a motor fuel in which ether is used and which enabled him to start within seven minutes a Liberty 12 1903-p motor that was left out all night in a temperature below freezing. The motorized apparatus was thoroughly frozen. It is said that the Hudson Bay Company will use the new fuel for airplanes and trucks.





*Ready to start. McNear body, White Model 50 chassis used by Marsters Touring Agency*

## Buses at the Boston Auto Show

NEW ENGLAND'S growing interest in passenger transportation by means of the motor bus was indicated by the exhibits at the Boston Automobile Show, Mechanics Building, Boston, Mass., during the week of March 12 to 17. Six makes of motor buses were viewed by bus operators, present and prospective, and they also attracted much interest among the many other visitors to the show. Representing probably the last word in luxurious accommodation, the "Mohawk III" attracted unusual attention. This is the third of its kind built for George H. Marsters, Inc., a touring agency of Boston, and used in summer tourist business in New England, and in Florida during the winter season.

A thirty-passenger Model 51-D was shown by the Garford Truck

Company with a body built by the Essex Body Company of Lynn, Mass. This model has a special underslung chassis, with an especially wide front, which it is said eliminates sideways. This particular bus was one of those sold to John Lovell for the Concord, Maynard & Hudson Bus Lines.

The Selden-de-Luxe touring type eighteen-passenger bus was an interesting feature of the show. The handsome body, finished in a blue and white color scheme, was built by the Brown Body Corporation, Cleveland, Ohio.

The Stewart Motor Corporation had on exhibition a 3-ton type passenger bus, with a Paterson Vehicle Company thirty-seat body.

In the exhibit of the International Motor Company a Mack AB type bus was shown, featuring patented

rubber "shock insulators" and the Mack one-piece dual reduction axle. It is claimed that by the use of these special shock insulators riding qualities are so improved that solid tires with their resulting economy can be used and still provide passenger comfort equal to pneumatics. This Mack bus was the second of its kind which has been sold to the Boston Elevated Railway.

It was reported that the Ultimate bus shown by the Vreeland Motor Company had been sold to the Norfolk & Bristol Bus Company of Foxboro, Mass. It was a twenty-five-passenger job, with a body built by the Burstein Body Works, Newark, N. J.

The "Mohawk" buses consist of a unique limousine type body, built by George W. McNear, Brookline, Mass. So far, three of these touring limousines have been delivered, and it is said that the Marsters Touring Agency is considering the purchase of two more. The body is of entirely original design and patents covering many of its features have been applied for.

The chassis of the Mohawk is the standard White Model 50, with minor alterations made by the body builder. It is pneumatic-tired throughout, with Miller cord tires 36x6, dual in the rear. The lines of the top of the radiator were slightly altered to conform to the hood design and the gasoline tank was shifted to a position under the driver's seat. Rolls-Royce type lamps were used for headlights and cowl lights.

In the body design Mr. McNear has gone the limit in providing Pullman-like accommodations and luxury for passengers. The frame itself is of Western ash, such as is used for the highest class limousine work, and is covered with 14-gage sheet alu-



*At Miami, Florida, showing the Marsters touring bus on winter duty*



## Bus Data from Providence

This Article Contains Comprehensive Data Regarding the Operation of Buses by the United Electric Railways

minum. The exterior finish is polished black enamel. There are full-width cross-seats for eighteen passengers and the driver. These are arranged in five sections, four passengers to a section, with side doors for each section opening on either side of the body. Probably the most unique feature is the provision of a baggage compartment to hold twenty-five suitcases, entirely separated from the passengers and placed in the extreme rear of the body; this fills the entire space where the sides curve into the rear, yet is so cleverly designed that it is not apparent from the outside that any space has been used for this purpose. The compartment door opens out to the rear and is automatically locked while the car is in service, so that it cannot be robbed. This permits the carrying of ordinary travelers' hand baggage without filling up the passenger compartment to the discomfort of passengers who are riding largely for pleasure. However, there is also room under the seats for additional suitcases should it be required.

All seats are hair-cushioned and covered with the finest grade hand-buffed leather. The cushions are very deep-seated, providing maximum comfort. Deep recesses are left under the backs of each seat, so passengers can extend their legs practically full length. At the backs of seats are pockets for canes and umbrellas, and also coat rails. Heavy plate-glass drop-sash are used and the window sash is so arranged that a plate of glass can be changed in five minutes in case of breakage on the road. Heavy linen curtains protect the passengers from the heat of the sun's rays. Solid mahogany woodwork is used throughout the interior and plate glass mirrors at the end of each seat on the main window post. The floors are carpeted.

This summer the Marsters Touring Agency will operate one "Mohawk" bus on a regular route between Boston and New York, via Providence, Narragansett Pier and New Haven, with an alternate route over the Mohawk Trail, via Greenfield, Williamstown, Albany and the Hudson River. Another touring limousine of the "Mohawk" type will operate between Boston and Montreal, and a third between Boston and Niagara Falls. In the winter all three buses are used in Florida. The touring agency was on the job at the show and distributed a leaflet, "Motoring in the Mohawk," at the exhibit of Mohawk III.

THE United Electric Railways, Providence, R. I., inaugurated bus operation last July on four lines, adding a fifth in October. The company operates all electric railway lines in Providence, a city of nearly 240,000 population, and in a score of neighboring cities and towns. It installed bus service as supplementary to the rail lines and at present has a fleet of seventeen buses. Elsewhere in this issue is a description of a fifty-bus garage which the company now has under construction.

Following is a complete summary of the characteristics of the several lines:

### PAWTUXET-LAKEWOOD BUS LINE

Length in miles.....1.10  
Fare.....6 cents  
Number of buses assigned.....1  
Headway.....30 minutes  
Transfers.....Not issued

For a number of years previous to 1922, the Pawtuxet-Lakewood line was

operated by two man trolley cars. For a part of 1922, it was operated with a one man trolley car. It was never a paying line, but was operated for the convenience of people residing in Lakewood who desired to go to Pawtuxet, which is a commercial center.

The track, for a part of the route, were laid along a state right-of-way and the State Board of Public Railways, in 1922, informed the company that the state would relay the main line road. This would have necessitated covering a portion of this track. Rather than to go to this expense, the company took off the car service and substituted a thirteen-passenger bus.

### PAWTUXET-WARRICK-DOWNS BUS LINE

Length in miles.....1.25  
Fare.....6 cents  
Number of buses assigned.....1  
Headway.....See note 1 below  
Transfers.....See note 2 below

Warwick Downs is a summer colony about 11 miles from Pawtuxet. This route coincides, for part of the way, with the Lakewood bus route, and (1) the Lakewood bus is used in this service.

2. There are not many all-year residents, and only a few trips morning and night are made in the winter. All-day service is given in the summer.

Previous to the inauguration of the bus service, the people had no transportation service whatever, either summer or winter, except what was spasmodically afforded by jitneys.

### PROVIDENCE-OAKLAND BEACH BUS LINE

Length in miles.....11.55  
Fare.....30 cents  
Number of buses assigned.....4  
Headway.....30 minutes  
Transfers.....Not issued

Four twenty-four-passenger buses operate on this line. The Providence-Oakland Beach line travels through a number of small summer resorts along Narragansett Bay.

In the summer the line is profitable, but in the winter, although there are a considerable number of all-year residents, the line is operated at a loss.

The company has a high-speed trolley line operating to Oakland Beach over a private right-of-way for much of the distance. There are stations along the line, but the colonies are so scattered that the bus line is operated through the winter for the benefit of those who live a considerable distance from the trolley station; otherwise, in many instances, a walk of a mile or more would be necessary to reach the station.

### PROVIDENCE-ARCTIC BUS LINE

Length in miles.....10.45  
Fare.....30 cents  
Number of buses assigned.....4  
Headway.....30 minutes  
Transfers.....Not issued

Arctic is a mill village about 103 miles from Providence. The United Electric Railways operates four twenty-four-passenger buses on this line.

There are operating on this route nine jitneys of the touring-car type, seating from seven to eleven persons.

Table 1—Bus Operating Data—United Electric Railways, Providence, R. I.

		Receipts Per Bus-Mile (Cents)	Average Total Operating Expenses Per Bus-Mile Including Taxes* (Cents)
1922	Lines		
	Pawtuxet-Lakewood	8.99	
	Pawtuxet-Warwick Downs	19.11	
	Providence-Oakland Beach	30.10	
	Providence-Arctic	8.53	
August	Average	19.31	18.04
	Pawtuxet-Lakewood	9.34	
	Pawtuxet-Warwick Downs	21.87	
	Providence-Oakland Beach	32.03	
	Providence-Arctic	14.09	
September	Average	22.86	20.18
	Pawtuxet-Lakewood	9.58	
	Pawtuxet-Warwick Downs	16.33	
	Providence-Oakland Beach	24.66	
	Providence-Arctic	18.32	
October	Average	21.05	21.75
	Pawtuxet-Lakewood	9.21	
	Pawtuxet-Warwick Downs	7.94	
	Providence-Oakland Beach	20.93	
	Providence-Arctic	21.14	
November	Average	20.34	25.32
	Pawtuxet-Lakewood	8.14	
	Pawtuxet-Warwick Downs	6.31	
	Providence-Oakland Beach	20.30	
	Providence-Arctic	24.25	
December	Average	21.94	26.58
	Pawtuxet-Lakewood	8.80	
	Pawtuxet-Warwick Downs	6.71	
	Providence-Oakland Beach	20.65	
	Providence-Arctic	25.34	
Average	Providence-Arctic	27.94	22.98
	Providence-Arctic	27.94	
Average		23.02	

\*Operating expenses cannot be segregated by lines.

Table II—Bus-Mile Data

	Pawtuxet-Lakewood	Pawtuxet-Warwick Downs	Providence-Oakland Beach	Providence-Arctic	Olneyville-Eddy Street
1922					
July 3-31 .....	1,438.33	2,560.73	25,228.82	23,783.68	.....
August .....	1,532.67	2,728.97	26,803.80	25,349.52	.....
September .....	1,476.70	2,631.10	26,096.71	23,658.98	.....
October .....	1,207.69	1,227.72	21,452.32	25,338.81	2,629.92*
November .....	1,132.74	1,143.86	20,550.73	24,364.59	4,724.48
December .....	1,252.51	912.27	21,159.34	25,425.88	4,814.76

\* Commence operation on October 15, 1922.

The jitneys do not operate on schedule time but leave when they are filled, while the United Electric Railways buses are run on schedules.

The trolley cars of the United Electric

Table III—Statement of Bus Operations  
July 3 to Dec. 31, 1922

	Total	Per Bus-Mile (Cents)
<b>OPERATING REVENUES</b>		
101-A Passenger revenue-bus operation .....	\$68,745.45	21.44
Total revenue from transportation .....	\$68,745.45	21.44
<b>OPERATING EXPENSES</b>		
12-A Removal of snow and ice .....	\$5.85	
24-A Buildings, fixtures and grounds .....	444.27	0.14
Total way and structures .....	\$450.12	0.14
29-A Superintending bus equipment .....	\$1,903.72	0.59
37-A Shop expenses, bus department .....	87.55	0.03
38-A Repairs to motor .....	6,070.95	1.89
38-B Repairs to chassis .....	3,372.37	1.05
38-C Repairs to body .....	1,358.00	0.42
38-D Tire repairs and renewals .....	5,632.41	1.76
38-E Miscellaneous bus maintenance .....	1,100.68	0.34
40-A Depreciation of buses .....	9,184.66	2.87
Total maintenance of equipment .....	\$28,710.34	8.95
63-A Superintending bus operation .....	\$1,838.73	0.57
78-A Operators' wages .....	17,782.72	5.55
78-B Garage employees .....	2,033.25	0.63
78-C Garage expenses .....	536.85	0.17
78-D Gasoline .....	12,471.96	3.89
78-E Lubricating oils and greases .....	1,565.40	0.49
78-F Miscellaneous bus transportation expenses .....	4,226.58	1.32
Total cond. transportation .....	\$40,455.49	12.62
80-A Advertising buses .....	\$331.32	0.10
84-A Salaries and expenses of general office clerks .....	9.10	
85-A General office supplies and expenses .....	23.75	0.01
86-A Law expenses .....	102.68	0.03
89-A Miscellaneous general expenses .....	589.31	0.19
92-A Injuries and damages .....	161.80	0.05
93-A Insurance .....	125.84	0.04
94-A Stationery and printing .....	62.50	0.02
95-A Store expense .....	735.00	0.23
98-A Rent of equipment .....		
Total traffic and general and miscellaneous .....	\$2,141.30	0.67
Total operating expenses .....	\$71,757.25	22.38
Net operating revenue .....	\$3,011.80	0.94
<b>TAXES</b>		
Net income .....	\$156.63	0.05
	\$3,168.43	0.99
<b>MISCELLANEOUS STATISTICS</b>		
Operating ratio (per cent) .....	104.38	
Average passenger revenue per day .....	\$377.72	
Revenue mileage .....	320,627.00	
Revenue passengers carried .....	848,546.00	
Gallons gasoline consumed .....	52,568.00	
Miles per gallon gasoline .....	6.10	
Gasoline cost per mile per gallon (cents) .....	3.80	
Investment—bus department:		
Motor buses .....	\$99,258.36	
Elmwood garage .....	90,857.92	
Miscellaneous .....	18,418.07	
Total .....	\$157,534.35	

Railways also operate to Arctic from Providence, touching the bus route at times and then branching off in other directions. As the buses are run express with but few stops, the trolley cars take care of much of the intermediate business. Because of this jitney competition, the bus line is not as profitable as it otherwise would be.

#### OLNEYVILLE-EDDY STREET BUS LINE

Length in miles.....1.40  
Fare.....6 cents  
Number of buses assigned.....  
One normal; two rush hour  
Normal headway.....60 minutes  
Rush-hour headway.....30 minutes  
Transfers.....Issued 2 cents each

## Watches Are Important Tools

THERE are few enterprises today in which time plays so important a part as in transportation. The wheels of the motor coach industry synchronize their revolutions to the ticks of the chronometer and efficiency cannot exist if either the wheel or the watch is not functioning properly. Therefore it behooves men engaged in the transportation field to give a serious thought to watches.

Coachmen are not asked to carry very many tools, and the most important part of their job has to do with time. The movement of coaches must be according to a prescribed schedule under normal conditions, and this timing cannot be carried on without the proper tools. These are the watches that every coach conductor or driver has, or should have, on his person at all times. It is just as necessary for the conductor to possess a good, reliable watch as it is for the driver, who must measure his progress along the route by the ticks of the chronometer.

Frequently drivers are heard to say, by way of explaining their early or late arrival at a terminal, that the dispatcher at another terminal gave them the incorrect time. Of course such is a possibility, but a check made of dispatcher's and supervisor's watches in the recent past revealed that if a difference existed it was merely a matter of seconds. A difference of even a minute is a rarity. Several dispatchers and supervisors are known to carry two and some of them three watches. They appreciate

The Olneyville-Eddy Street (South Providence) line is operated with a twenty-four-passenger bus. Two buses, however, are operated at the rush-hour period.

This is a cross-city route and one which has been suggested for a number of years for trolley operation, because of the community interest between the Olneyville section of Providence and the South Providence section of Providence. The company has never constructed the trolley line because it did not feel that there was sufficient traffic to warrant so great an outlay for track construction. This is borne out by the earnings of the bus on this route, as the line is being operated at a very small gain.

The operating results for all of these lines, from the beginning, and including the latest audited figures are given in Table I.

The data of bus-miles run for the several routes are given in Table II.

A detailed analysis of revenue and costs is given in Table III.

the frailty of the watch mechanism and realize that climatic conditions have a serious effect on the works.

While there unquestionably are some very fine time pieces along our routes, such as the clock in the Metropolitan Tower, it is not advisable to depend upon them for the correct time. These clocks are stationary and are subject to the changes that unfavorable climatic conditions produce. Then, it must be remembered, the hands on most of these clocks are electrically controlled and do not move until the completion of the minute. Therefore you may glance at the Metropolitan Tower and set your watch accordingly only to find later that it may be fifty-nine seconds slow.

Jewels are the most important feature of a watch. They aid in eliminating friction, the retarding influence in any piece of mechanism. Oil is employed in the automotive industry to lubricate the parts where friction is the greatest. It is, of course, virtually impossible to lubricate a watch, so the next best means to combat friction found thus far by jewelers has been jewels. It is a known fact that all steam railroads require their men to possess a watch that has at least nineteen jewels.

While there is no rule requiring it, every one of our coach men should possess a good watch. If this were the case one source of annoyance could be eliminated.

—From *Motor Coach*, the monthly magazine of the Fifth Avenue Coach Company, New York.



*Coaches loading at Youngstown Terminal*

## De Luxe Service Given by Interurban Coach Line

**Y**OUNGSTOWN, OHIO, is the center of one of the most important steel and iron manufacturing districts in the country, as well as being located in a rich dairying and agricultural section. Youngstown and Warren, 15 miles distant, are closely connected industrially, commercially and socially. For years interurban railway service has been maintained between these points by the Pennsylvania-Ohio Electric Company. Since Aug. 1, 1922, de luxe motor coaches have been operated by the company over the highways paralleling the railway tracks. This in itself is unusual, but there is more to this plan than mere parallel motor and electric operation.

The Pennsylvania-Ohio Company has pioneered in attempting an experiment in transportation that is of outstanding importance. The company has succeeded, by the use of two modes of transportation with different rates of fare, in dividing

**Pennsylvania-Ohio Electric Company Operates Coach Lines Paralleling Interurban Routes—Revenues of Both Lines Increased. Competition Lessened and Traffic Divided Into Two Classes Since Adoption of Coaches—Lines Serve Steel Manufacturing and Farming District Bordering on Ohio-Pennsylvania Line**



its traffic into two classes and at the same time it has operated both electric and motor lines upon a paying basis.

On Nov. 5, 1922, the company repeated the experiment by installing motor coach service between Youngstown and Sharon, Pa., over a 15-mile route paralleling the Youngstown-Sharpsville trolley line.

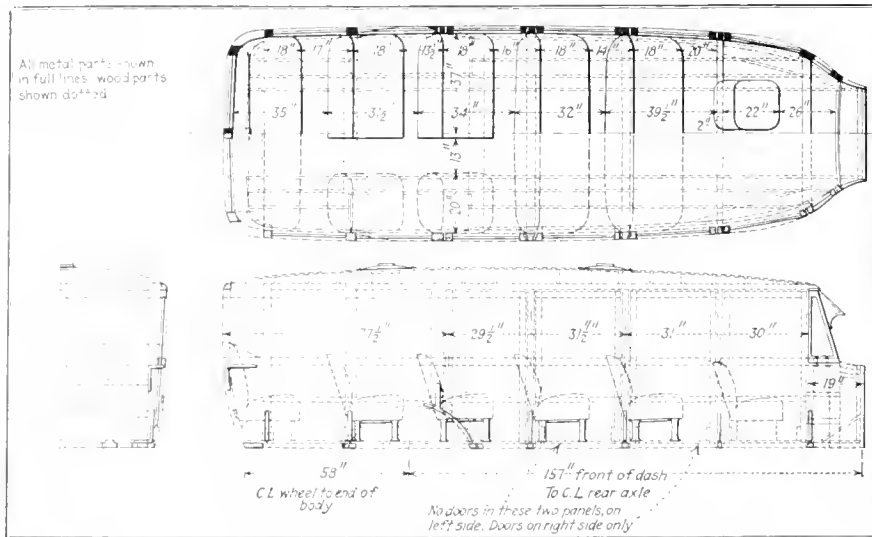
The motor coach business of the company is conducted by a subsidiary concern, the Pennsylvania-Ohio Coach Lines, Inc.

The most important cities covered by the Youngstown-Warren line are:

Youngstown, with a population of 132,000; Girard, 6,500; Niles, 13,000, and Warren, 27,000. On the Youngstown-Sharon branch, Hubbard, Ohio, 8 miles northeast of Youngstown, has a population of 3,000, and Sharon, Pa., the eastern terminus, an important coal mining and iron manufacturing city, has 21,000 inhabitants.

Paved highways make up both routes with the exception of a 1-mile stretch in Niles which is composed of cobblestones. This, however, is scheduled for repaving this year. Most of the highway on the Youngstown-Warren line has single trolley tracks in the center, but there are many short stretches between towns where the railway tracks are on the side of the highway, giving the buses the use of a 20-ft. roadway.

The rolling stock of the company consists of twelve eighteen-passenger coaches built by the Bender Body Corporation, Cleveland, to the design



Seating plan and elevation of Bender body used in Youngstown

developed by R. N. Graham, general manager of the Pennsylvania-Ohio Electric Company, and mounted on the White Company's model 50 bus chassis. This chassis was described on page 487 of BUS TRANSPORTATION for September, 1922.

The body is of special construction and of a type that is useful in the operation of lines upon which there is little or no interchange of passengers except at certain fixed points. The coach bodies are 18 ft.

6 in. long, 6 ft. high from chassis frame to roof, and 75 in. wide. All seats are crosswise, three of them running the full width and each accommodating four passengers. The two seats directly over the rear axle are divided by an aisle, one passenger being accommodated to the right and two to the left of the aisle in each of them. The driver's compartment is separate from the passenger compartments by a split sliding glass bulkhead. No passengers are car-

ried in the driver's compartment, the extra space there being utilized to carry the passenger's hand baggage.

Four doors open from the running board into the passenger compartment, three on the right side and one on the left. Two doors, one on either side, open into the driver's section. The fittings, finish and equipment throughout have been carefully selected and designed to add to the elegance of appearance and comfort of the passengers. The cushions and backs of all seats are heavily padded and are upholstered in dark green hand-buffed leather, which also is used for the interior trimming to the roof line. Six dome lights in the roof give ample, soft illumination, while perfect ventilation in all weathers is assured by the two roof ventilators and the ventilating windshield.

The heating system was devised by John Bender, of the Bender Body Company, being used for the first time on the Pennsylvania-Ohio coaches. It comprises a series of pipe coils running from the engine along the side of the coach, branching under each seat and with the exhaust under the coach at the rear. It has proved superior to former methods of heating, having stood the test of some severe weather.

Extra precautions have been taken in the construction to prevent the development of any rattle in the coaches. Silencers were installed in all doors and windows and the roof is heavily padded, as was the body frame before the 16-gage aluminum panels were placed. Likewise, between the body and the frame there is a strip of  $\frac{1}{4}$ -in. felt.

The floor stringers are of ash full length. In constructing the body the cross members were mortised, glued and screwed together. The side posts, also of ash, were mortised and screwed, then braced with iron or bronze braces and screwed down, after which the carlines were set in and screwed.

The roof is of tongue and grooved slats and covered with Pantasote. Inside the roof is covered with leather. An unusual feature is that the front casting holding the windshield is in one piece instead of in several sections, as is commonly the case.

The general pleasing appearance of the coaches is still further set forth by the use of heavy plate glass throughout, the installation of Bausch-Lomb headlights, and special parking lights and the use of nick-

Time-table in operation on Youngstown-Warren line

THE PENNSYLVANIA-OHIO COACH LINES		
Limousine Coach Service		
Youngstown-Warren		
Schedule Effective Sept. 22, 1922		
EAST BOUND		
Leave Warren	Leave Niles	Leave Girard
16:00 A.M.	16:15 A.M.	16:30 A.M.
6:45 "	7:00 "	7:15 "
7:45 "	8:00 "	8:15 "
8:45 "	8:30 "	8:45 "
9:15 "	9:00 "	9:15 "
9:45 "	9:30 "	9:45 "
10:15 "	10:00 "	10:15 "
10:45 "	10:30 "	10:45 "
11:15 "	11:00 "	11:15 "
11:45 "	11:30 "	11:45 "
12:15 P.M.	12:00 "	12:15 P.M.
12:40 "	12:30 P.M.	12:45 "
1:00 "	12:55 "	1:10 "
1:20 "	1:15 "	1:30 "
1:40 "	1:35 "	1:50 "
2:00 "	1:55 "	2:10 "
2:20 "	2:15 "	2:30 "
2:40 "	2:35 "	2:50 "
3:00 "	2:55 "	3:10 "
3:20 "	3:15 "	3:30 "
3:40 "	3:35 "	3:50 "
4:00 "	3:55 "	4:10 "
4:20 "	4:15 "	4:30 "
4:40 "	4:35 "	4:50 "
5:00 "	4:55 "	5:10 "
5:20 "	5:15 "	5:30 "
5:40 "	5:35 "	5:50 "
6:15 "	6:00 "	6:15 "
6:45 "	6:30 "	6:45 "
7:15 "	7:00 "	7:15 "
7:45 "	7:30 "	7:45 "
8:15 "	8:00 "	8:15 "
8:45 "	8:30 "	8:45 "
9:15 "	9:00 "	9:15 "
9:45 "	9:30 "	9:45 "

\* Twenty minute service continues until 10:40 P. M. Saturday and Sunday.

† Daily except Sunday.

THE PENNSYLVANIA-OHIO COACH LINES		
WEST BOUND		
Leave Youngstown	Leave Girard	Leave Niles
17:00 A.M.	17:15 A.M.	17:30 A.M.
8:00 "	8:15 "	8:30 "
9:00 "	9:15 "	9:30 "
9:30 "	9:45 "	10:00 "
10:00 "	10:15 "	10:30 "
10:30 "	10:45 "	11:00 "
11:00 "	11:15 "	11:30 "
11:30 "	11:45 "	12:00 Noon
12:00 Noon	12:15 P.M.	12:30 P.M.
12:20 P.M.	12:35 "	12:50 "
12:40 "	12:55 "	1:10 "
1:00 "	1:15 "	1:30 "
1:20 "	1:35 "	1:50 "
1:40 "	1:55 "	2:10 "
2:00 "	2:15 "	2:30 "
2:20 "	2:35 "	2:50 "
2:40 "	2:55 "	3:10 "
3:00 "	3:15 "	3:30 "
3:20 "	3:35 "	3:50 "
3:40 "	3:55 "	4:10 "
4:00 "	4:15 "	4:30 "
4:20 "	4:35 "	4:50 "
4:40 "	4:55 "	5:10 "
5:00 "	5:15 "	5:30 "
5:20 "	5:35 "	5:50 "
5:40 "	5:55 "	6:10 "
6:00 "	6:15 "	6:30 "
6:30 "	6:45 "	7:00 "
7:00 "	7:15 "	7:30 "
7:30 "	7:45 "	8:00 "
8:00 "	8:15 "	8:30 "
8:30 "	8:45 "	9:00 "
9:00 "	9:15 "	9:30 "
9:30 "	9:45 "	10:00 "
10:00 "	10:15 "	10:30 "
11:00 "	11:15 "	11:30 "

\* Twenty minute service continues until 11:40 P. M. Saturday and Sunday.

† Daily except Sunday.

Warren Terminal is located at Interurban Station near Erie Depot.

The Youngstown Terminal is located at Federal and Phelps Street.

eled hardware inside and outside. The exterior painting is deep blue and black.

These are some of the interesting features regarding the construction of the de luxe bodies, which weigh 2,600 lb. each.

Many safety accessories are used as part of the equipment on these coaches; some of these are speed governors on the engine, headlight dimming devices, leather-covered sun visors, automatic windshield cleaners, spotlights and automatic rear-end stoplights.

In addition to the regulation Ohio motor vehicle taxes and to the federal yearly tax local license fees of \$50 are paid in Warren, Niles, Girard and Youngstown.

The company carries a blanket insurance policy of \$75,000 covering liability insurance for injury to passengers and property damage. The policy provides for \$10,000 for any one person injured in an accident, with a total of \$50,000 for all injuries in any one accident.

A most interesting feature of the operation of the Youngstown-Warren line is that even with the fares 50 per cent higher than its direct competitor, the coaches have shown a continued increase in earnings every week since operations were begun last August. Doubtless some of this revenue has been taken from the company's railway line, but nevertheless the latter shows a steady increase in revenue; not as great, however, as that of the coach lines. The combined earnings of the rail and motor lines exceed by far those of a year ago. This situation is more fully explained by the accompanying graph which shows the revenue received on each route by weeks for both forms of service.

The fluctuations in the interurban revenue are said to be caused by the fact that daily revenues are not calculated by determining the equivalent value of fares carried, but are arrived at by adding the cash turn-in of the

THE PENNSYLVANIA-OHIO ELECTRIC CO  
Motor Coach Passenger Department  
LOCAL TARIFF

INSUED SEPTEMBER 21 1922 EFFECTIVE OCTOBER 21 1922

Issued By:  
CLYDE D. SMITH  
General Superintendent

*Tariff showing present rates over  
Youngstown-Warren branch*

conductors to the ticket sales at the office. These ticket sales are not always reported so as to reflect the actual business of each day and it is not unusual to have fluctuations as are observed on the chart. One of these occurred during the week of Nov. 5, which, together with the fact that it was a non-pay week, would lead to the erroneous conclusion that the inauguration of the coach service was responsible for a decrease of approximately \$1,000 in interurban revenue. A further analysis of the fluctuations will indicate that this condition did not exist. For instance, for the week of Nov. 19, the increase of receipts over the previous week was chiefly upon the interurban car line for the reason that the increase in the total revenue is approximately the same as the increase in interurban revenue.

*Comparison of Revenue for  
Motor Coach and Interurban  
Lines. At left, Youngstown to  
Warren, and at right, Youngs-  
town to Sharon*

However, it can be stated that the Youngstown-Sharon coach line has taken a greater percentage of traffic from the interurban trolley line than has been the case upon the Youngstown-Warren line.

The Youngstown-Warren route is divided into three fare zones, each with a 20-cent fare. The through fare, however, is 15 cents, which is equivalent to 3 cents a mile. On the trolleys the rate between the same competing points is 30 cents, or three 10-cent fare zones.

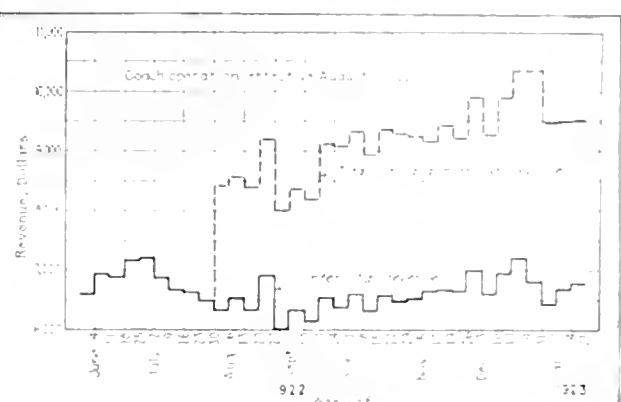
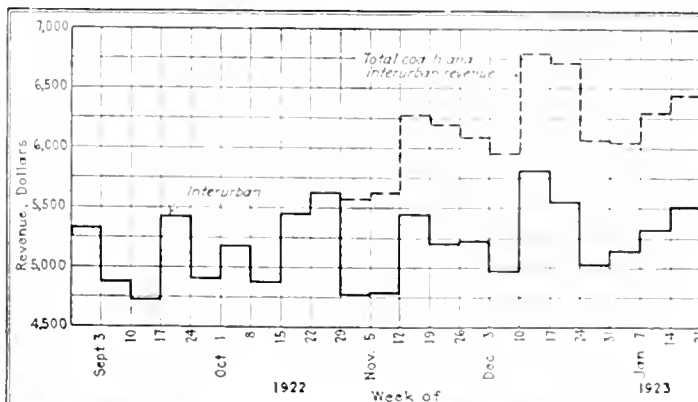
These figures serve to illustrate the company's plan of dividing the traffic. The higher fare on the motor coaches, of course, creates a barrier against the use of the de luxe service by the lower class of riders.

The through fare on the 15-mile Youngstown-Sharon line is 50 cents divided into two zones, as compared to the trolley fare of 35 cents, with zones in most of which the fare is 10 cents or higher.

An innovation has been introduced by the advance sale of tickets over all the coach lines. On the Youngstown-Sharon route seat reservations even can be made in person or by telephone. At Youngstown, at the main office and waiting station for both interurban cars and coaches, at Boardman and Champion Streets, similar tickets are sold.

A ticket agency has been established in a local store on Phelps Street for the sale of coach tickets for the Youngstown-Warren line, inasmuch as the demand for the maintenance of a separate ticket office had to be met, because of the distance between the terminals of the two coach lines.

In Warren, tickets are sold at the interurban ticket office. Everything possible is done to facilitate fare collection on the coaches, as it must be remembered that the seat entrances are from running board instead of through a service door as in the street car types of bus. The driver collects all fares prior to leaving.



ing the terminal and collects from passengers picked up en route as they enter the coach. This practice means the driver must leave his seat at such times.

After each round trip the driver turns in all cash and tickets collected to a receiver in the Warren ticket office, who gives him a receipt and makes an entry on a record sheet of all cash and tickets by denominations to show the length of haul. Coach drivers are paid a flat rate of 50 cents per hour. The traffic is checked by on and off methods. The average fare is found to be 38 cents and average length of ride 12 miles.

When the Youngstown-Warren line was first put into operation a half-hourly schedule was observed. On Dec. 6, 1922, a new schedule was put into effect, providing for fifteen-minute service during afternoons and early evenings, and twenty- to thirty-minute service at periods when travel is less heavy. The fifteen-minute service is extended over a longer period during the heavy week-end traffic.

Service from the Sharon terminal starts at 6:30 a.m.; the next coach leaves at 7:15 a.m., and afterward until 10:15 p.m., hourly service is maintained. The first coach leaves Youngstown at 6:25 a.m., followed by another at 7:15 a.m., after which the schedule calls for hourly trips until 11:15 p.m. During the three months of operation the patronage on the Sharon route has constantly increased so that the company now plans to operate its coaches at closer intervals during the rush hours.

The upkeep and maintenance of the coaches is by no means the smallest part of the operation of the system. The company has developed many systematic methods of keeping its rolling stock in up-to-the-minute condition.

The garage of the Youngstown-Warren line is located in Warren,



*Interior of coach showing seating arrangements and ventilation and lighting systems.*

less than a block from the terminal. Here a building 50 ft. x 70 ft. is leased for a term of years. The roof was trussed so as to eliminate posts and thus have a full clear span. For heating there are Peter Smith heaters with motor-driven fans.

The garage force is divided into two shifts: a day force consisting of one mechanic and a helper—a night force of one mechanic, one washer and one polisher.

For oil storage in the garage a tank of 25-gal. capacity is used. At the curb outside is a 1,000-gal. gasoline tank, the property of the Vahey Oil Company, a Youngstown concern from which high-test army gasoline is bought in tank-wagon lots.

The garage equipment consists of:

One valve grinder, manufactured by the Franklin Machine & Tool Company, Springfield, Mass.

One arbor press, manufactured by the Manley Manufacturing Company, York, Pa.

One Black & Decker electric drill, semi-portable type.

One Alemite grease gun (motor driven).

One motor-driven air compressor, manufactured by Union Engine & Manufacturing Company, Butler, Pa.

One vacuum cleaner.

In addition to a complete annual overhaul and a general weekly inspection, all coaches are gone over nightly. They are washed only with

adulterated Mahoning Valley water, and no soap is used except on the wheels and running gear. The nickel plate is polished and the interior of each coach is cleaned with vacuum cleaners nightly. The spring shackles and bearings are greased every night, and valves are ground after 3,000 to 4,000 miles of operation. The average gas consumption of the coaches is 1 gal. to 8½ miles, except for periods of exceptionally cold weather when engines run while coaches are standing, to maintain heat in the coaches.

The garage of the Youngstown-Sharon line is located at 214 Bridge Street, Sharon, Pa. This is 60 ft. x 30 ft. in dimension and is one of the most modern garages in that section. It is entirely free from obstructions and has a capacity for twelve or more coaches, as well as providing ample shop space.

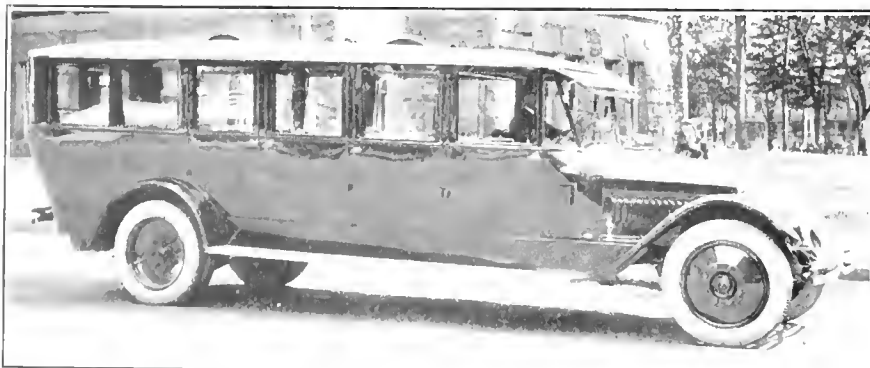
A day card and a trouble sheet are kept by each operator and aid much in systematizing the business.

Some parts of the routes are hilly, and as an aid to hill climbing a new head has been placed upon the engine to increase the size of compression and thus prevent pre-ignition. Rear axle ratios were first changed from 5.86 to 4.66 and will be changed to 4.25 in an endeavor to cut down the noise of operation.

The manner in which the accounts are classified follows:

#### Classification of Accounts for Youngstown-Warren Coach Operation Effective October 1st, 1922

REVENUE	
Passenger earnings.	
Rent of equipment.	
Revenue from advertising.	
OPERATING EXPENSES	
<i>Maintenance, Way and Structures</i>	
821—Repair to garage buildings.	
<i>Maintenance of Equipment</i>	
829—Superintendence.	
830—Repair chassis.	
831—Repair bodies.	
832—Tire repairs and renewals.	
833—Accessories.	
837—Shop expense.	
<i>Conducting Transportation</i>	
863—Superintendence.	
864—Chauffeur wages.	
868—Dispatcher's and street men's wages.	
867—Miscellaneous service expense.	
870—Garage employees.	
871—Garage expenses.	
875—Gasoline.	
876—Lubricating oil.	
878—Miscellaneous transportation expense.	
<i>Traffic</i>	
880—Advertising.	
<i>General and Miscellaneous</i>	
883—Salaries of general officers.	
881—Salaries of general office clerks.	
885—Office rent.	
885—Office supplies and expense.	
889—Telephone expenses.	
892—Liability insurance.	
893—Fire insurance.	
891—Stationary and printing.	
895—Store expenses.	
889—Miscellaneous.	
898—Rent of equipment.	
899—Rent of garage.	
<i>Total Operating Expenses</i>	



*Type of bus operated over P. O. Coach Lines—special Bender De Luxe Body mounted on White chassis*



# Fifty-Bus Garage for the United Electric Railways

The Company Is Building a Garage and Service Building in Providence to House Present and Prospective Bus Equipment and Will Have There the Best of Facilities for Economical Maintenance

THE United Electric Railways, Providence, R. I., has gone into the bus business on a considerable scale and is securing valuable information regarding this phase of transportation. The company has at present seventeen buses of several different makes. These have been maintained in the railway repair shops. Operating data for these buses are given elsewhere in this issue of BUS TRANSPORTATION.

The company determined, last year, to centralize the bus equipment by building a garage at a point convenient to the bus lines, of size sufficient to care for prospective growth but with provision for further expansion if needed. Accordingly the garage was designed for a present capacity of fifty buses. It is under erection on a site at Russell and Melrose Streets.

Before the details were decided upon a number of preliminary studies were made to insure the best results at a minimum of cost. In fact, the item of cost was emphasized by the

board of directors, who are determined to put the property on an increasingly sound financial basis.

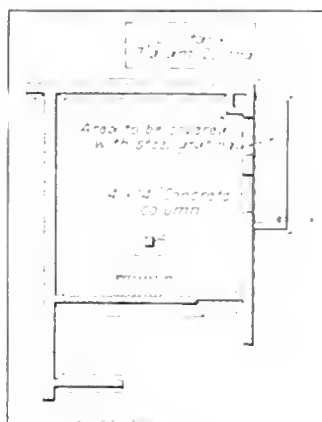
Among the first questions was one as to the necessity for an unobstructed floor in the bus shed. This would

have necessitated the use of roof trusses. While the entire floor could thus have been utilized the construction was considered unnecessarily expensive. Trusses would have had to be fireproofed or a ceiling would have had to be put under them. This would have cost about \$16,000 more than the column-supported roof as actually adopted.

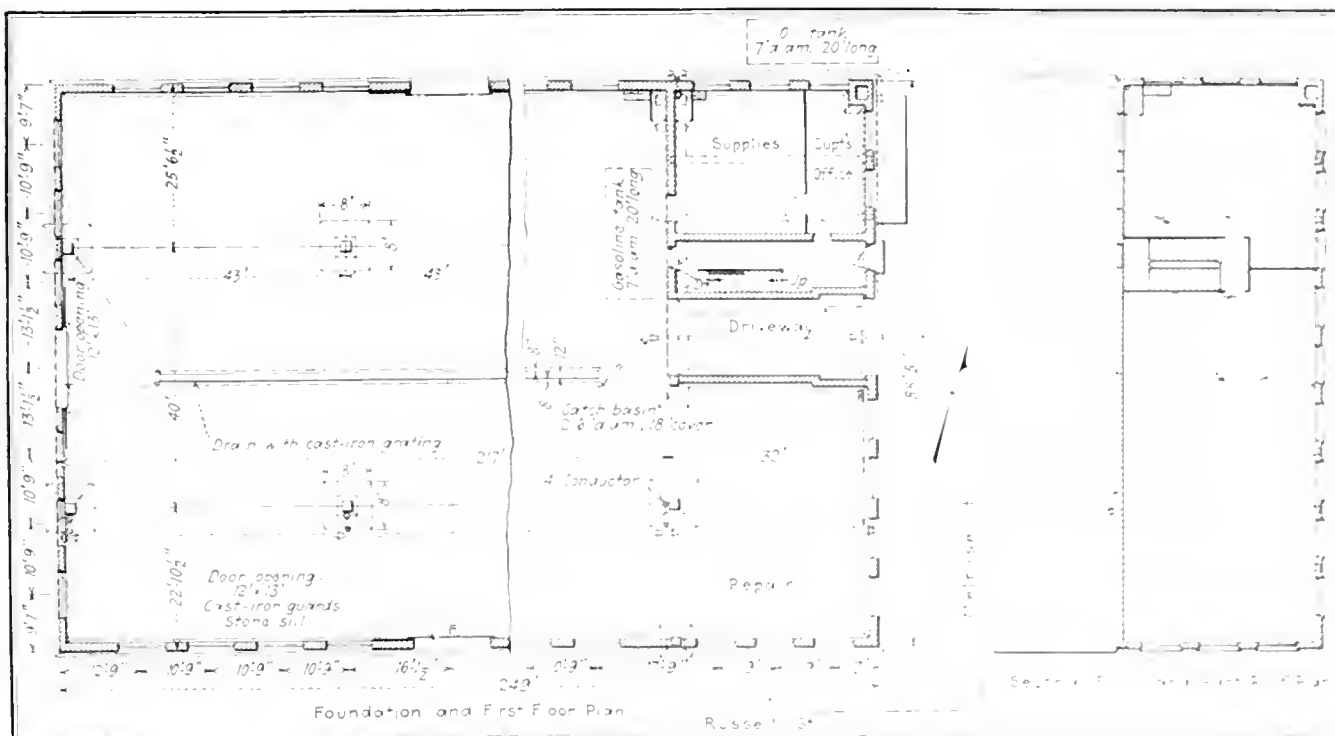
Another arrangement considered was that of two decks, a plan used in many garages. As there was plenty of space available for a single-floor garage it was decided that from the operating standpoint it was best to have the buses all on one floor.

The use of pits for repair work was also considered, but it was decided not to use them on account of the danger involved.

The result of the preliminary study was a design for a fireproof building, involving a bus shed 218 ft. x 88½ ft. in dimensions, with a two-story office, supply and locker-room building at one end. The overall dimensions of the building are



Above, plan of basement of service building. Below, at left, general plan of bus shed and service building. Below, at right, plan of second floor of service building and bus-shed roof.



249 ft. x 88½ ft. The bus shed provides for the storage of twenty-five buses at right angles with each longitudinal wall, with a wide aisle for maneuvering the buses in the center. The bus shed is 17 ft. high in the clear. One end is a temporary wall, permitting extension without great expense. The construction and dimensions are such that the building could readily be converted into an excellent carhouse in case the necessity arose.

The building is of reinforced concrete throughout, differing from the slow-burning construction used in the company's carhouses. The bus shed roof is of 4½-in. concrete slab, supported on massive reinforced girders and columns, the latter spaced 43 ft. on centers. The columns rest on foundations with a spread of 8 ft. x 8 ft. Some idea of the strength of the construction can be gathered from the fact that the longitudinal concrete roof girder is 56 in. x 20 in. in dimensions.

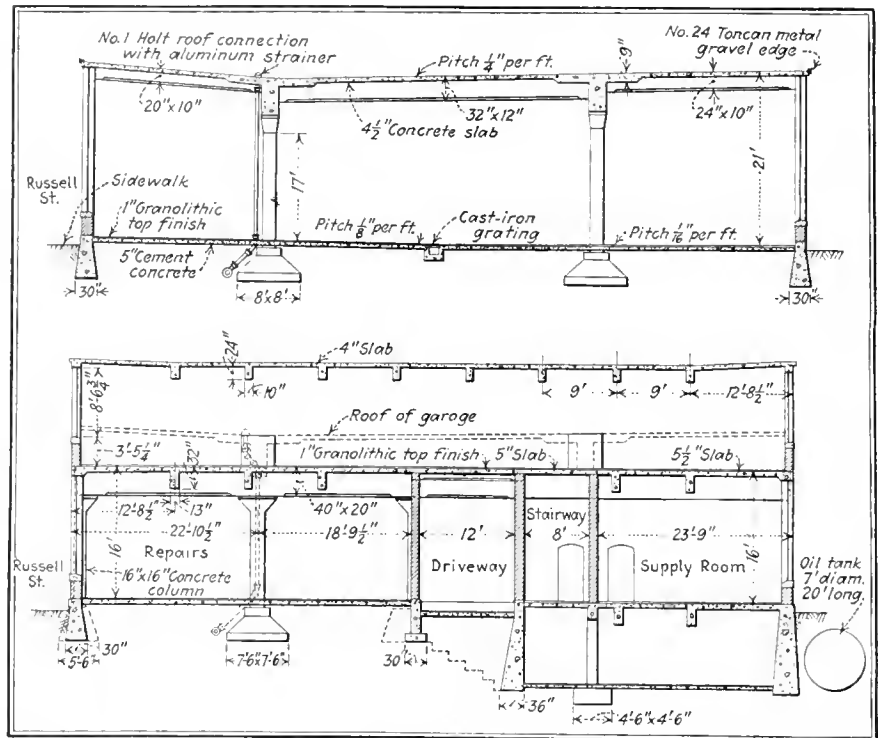
The roof was designed for a live load of 40 lb. per square foot. It pitches both ways toward the row of columns nearer the Russell Street side, where the water is carried off in 5-in. drains mounted close to the columns. The pitch of the roof is ¼ in. per foot on the long slope. The roof water, as well as all other drainage except the drip from the buses, goes into a cesspool.

The floor of the bus shed is of concrete, 5 in. thick with a 1-in. granolithic finish. It drains toward the center of the building, where a 12-in. x 12-in. gutter, covered with cast-iron gratings, receives the drainage. This drain pitches toward the front of the building, where it empties into the sewer.

The walls of the bus shed consist practically altogether of brick piers and metal sash, thus providing a large window area and excellent day-time lighting. The interior will be left with the natural finish of the brickwork and timbers.

The two-story section of the building provides, on the first floor, an office for the superintendent, a supply room, a liberal repair section and a driving entrance. The last-named has a slight ramp rising from the ground level to the level of the bus-shed floor. Upstairs is liberal space for a locker and recreation room for the employees. The walls and ceilings in this section will be neatly finished.

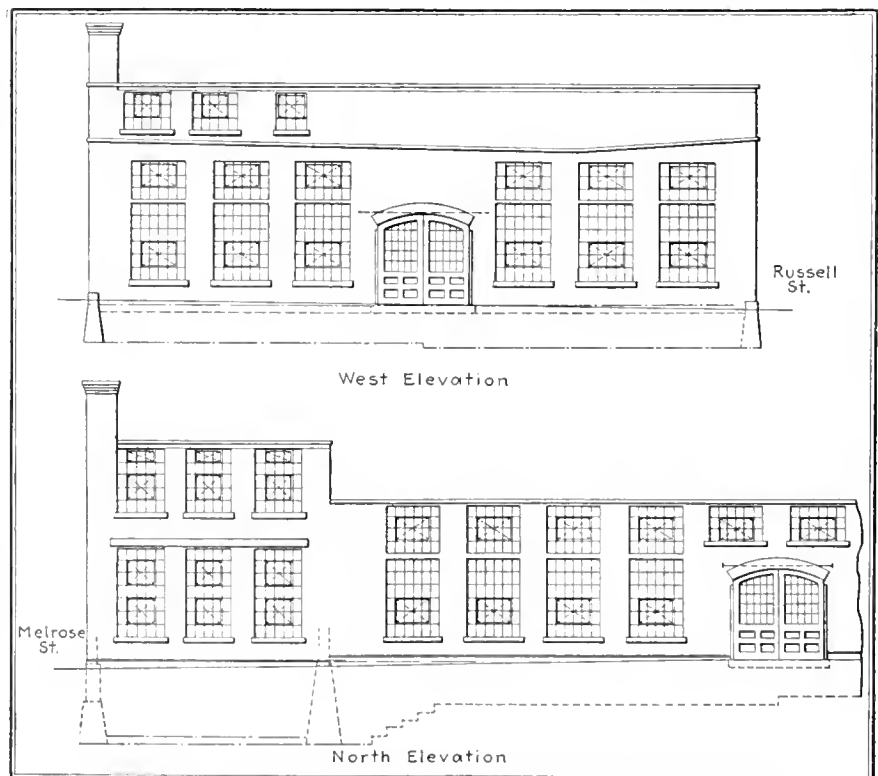
The building will be heated by



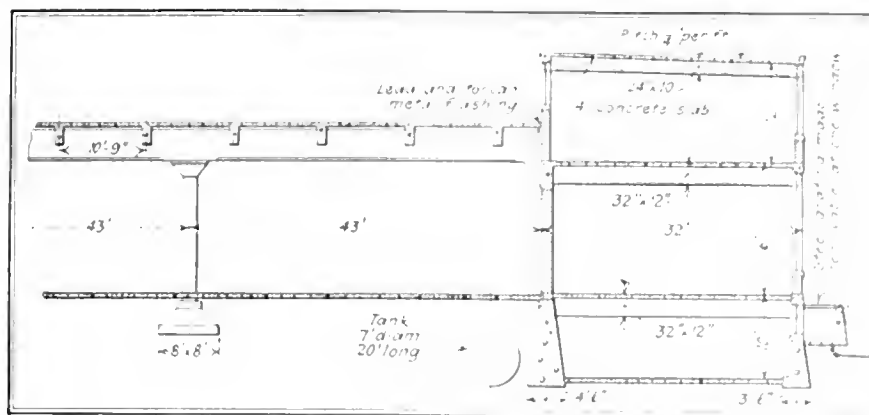
At top—Cross-section of bus shed looking west. Below—Cross-section of building at two-story end, looking west

steam generated from fuel oil. A boiler room is provided in the basement, with an oil tank 7 ft. in diameter and 20 ft. long buried in the ground just outside the wall. In the bus shed the heating coils will be mounted around the walls above the

level of the buses so that the latter will not back into them. While this places the heating coils higher than is desirable from the standpoint of distribution of heat, it was considered the best all-round arrangement. Gasoline for the buses will be



West and north elevations of garage building, showing general external architectural features



*Longitudinal section at north end of column, looking north*

stored in a 10,000-gal. tank buried below floor level in the bus shed near the supply room, where the usual filling and measuring equipment will be installed.

The garage was planned with a view to the buses entering at one end and leaving at the other. There are doors on the side, but these are for emergency use only. The doors and other clearances were designed

for single-deck buses, although provision could be made for double deckers in case the use of these should later prove desirable.

Washing of buses will be done in the wide central aisle.

Electric power for the machine tools and lighting will be alternating current, purchased from the Narragansett Electric Lighting Company.

## An English Front-Drive Trolley Bus

**Double-Deck Vehicle Has Seating Capacity of Sixty-four—  
Stairway to Upper Deck Is Inside—Design Incorporates  
Provision for Easy Riding Qualities**

**T**HE development of a front-drive railless trolley car has for a considerable time occupied the attention of Trackless Cars Limited, Leeds, England, and a description is here given of the latest type of vehicle which this company has evolved. The firm's front-drive principle has been in use by the Leeds Corporation Tramways for nearly three years and is reported to give much satisfaction.

The makers claim that the front-drive system is simpler and more efficient than the drive of the usual type. On account of the new design, it is possible to withdraw and replace the driving mechanism in one complete unit. There are no drive-shafts, gear chains or differentials. The drive is direct by pinion on the motor shaft to the road wheel. By having the power unit at the front, it is possible to drop the chassis to within 11 in. of the ground, thus insuring the benefit of a low center of gravity. This en-

ables a double-deck body with a covered-in top to be fitted without the risk of overturn.

The aim of the makers has been to put on the market a vehicle which will give the maximum service at the minimum expense, and with this object in view particular attention has been paid to the following points: Elimination of all unnecessary mechanism, simplicity in design, accessibility, increased efficiency, low maintenance charges and standardization.

The front-drive combination is a self-contained unit and can be taken out of the chassis frame by merely undoing eight bolts. A defective unit can be taken out and a spare one placed in position in two hours. Brake pedals and levers, steering column, etc., are fixed. The fore carriage consists of an upper and a lower portion, the latter (or under carriage) being virtually connected to or fixed to the upper turntable through a well-tested design of ball-race. Connection is made between

the under carriage and the rotating turntable by clamping the inverted semi-elliptic springs to seatings. The springs are also attached by links to the torque arms.

By a method of three-point suspension of the front drive unit the starting torque is absorbed before the reaction is transmitted through the chassis frame. This insures easy starting of the vehicle.

### MOTOR MOUNTING ON THE FRONT AXLE

Two motors are employed, mounted fore and aft on the front axle, and supported at the outer ends by means of shock absorbers bearing on the under-carriage frame. The motors are of the interpole type and are of a power depending on the requirements of the service. Owing to varied conditions of road surfaces self-alignment of the motors is of importance. The motors are therefore separately suspended, thus rendering it possible for them to take up their own relative positions during operation. A pinion on the end of each motor shaft engages directly with an internal gear ring fixed in the road wheel. The gears are inclosed and run in oil. A controller of the series-parallel type, located on the floor of the driver's cab, is used. There are two circuit-breakers with blow-out coil and simple trip mechanism. The breaker is reset by means of a handle of insulating material. Bearings required for brake-lever shafts, etc., are cast on the fixed turntable, an arrangement which aids in reducing maintenance costs and in facilitating inspection. Irreversible steering is obtained by means of a worm and worm rack, by which the turntable and fore carriage are rotated. By tests it has been proved that no road obstacle placed in the path of one of the front wheels can deflect the line of motion of the vehicle, even were the driver not holding the steering wheel.

The chassis frame is of channel section steel suitably braced by transverse members. Long, resilient, semi-elliptic springs are fitted to the wheels. The rear wheels are fitted with a supplementary springing device, in order to insure easy riding for both light and heavy loads. The front axle is turned from 3 per cent nickel steel, while the rear axle, which is of the same material, is cranked to allow for the low floor of the bus body. This axle, of course, has no driving stress to take, its



*Novel type of trolley bus with front drive carried in self-contained unit*

work being confined to carrying the load and withstanding the stress from braking on the rear wheels. A spring box, containing the rear spring, is fitted on the squared portion of the axle, thus preventing any risk of slip bolts failing or of springs getting out of alignment. The wheels are fitted with brakes of the internal expanding type, two brakes on each rear wheel and one on each front wheel. The rear brakes are operated by foot, and one set is connected with a ratchet device attached to the pedal

for easy holding of the vehicle on an incline. A hand lever operates the emergency brakes, which are placed on the front wheels.

#### BODY CONSTRUCTION

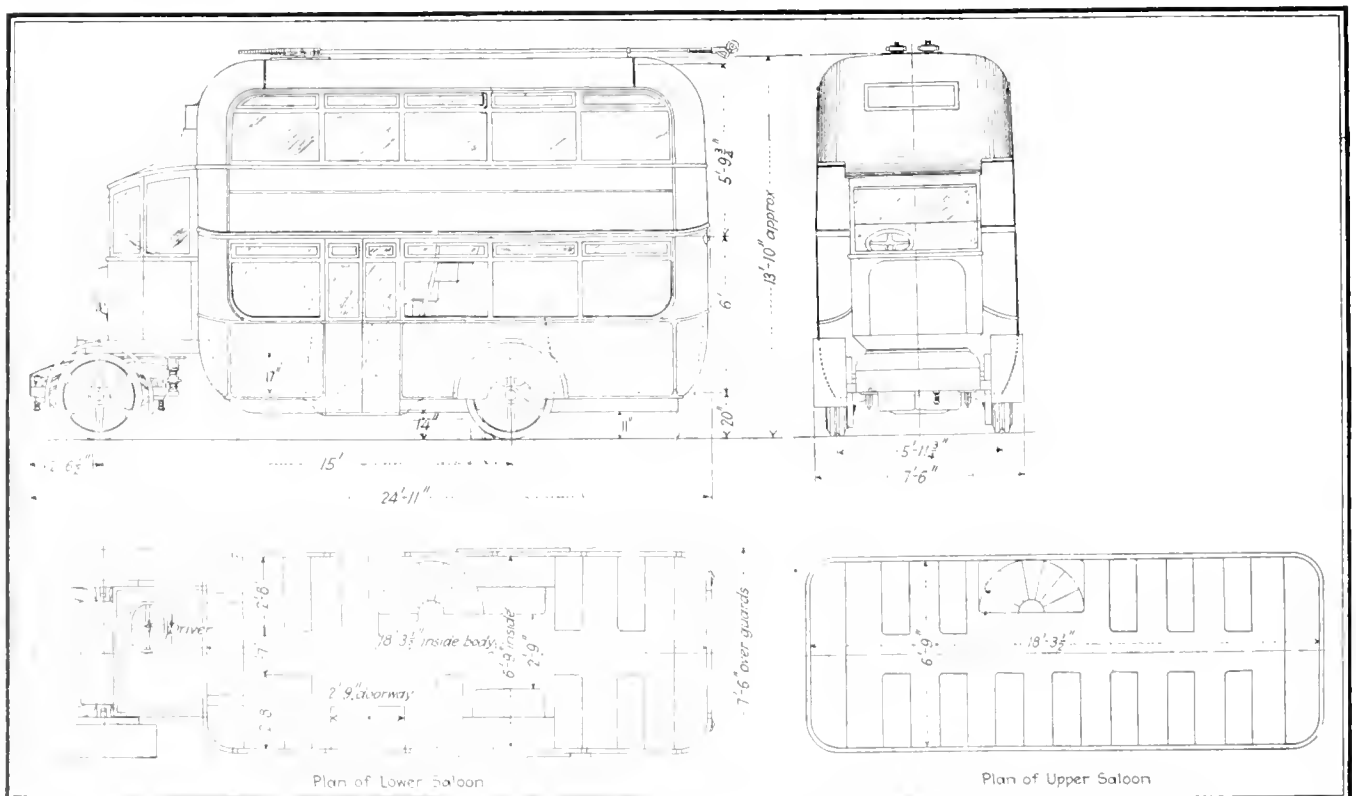
Features of the body construction are the rounding off of angles and an internal staircase. The underframe and end sills consist of ash, strengthened with steel plates, tied together with steel angle brackets. Corners and side posts are of ash and interior panels are of polished wal-

nut, all sheathed on the outside with sheet steel. The over-all height of the bus from the ground is 13 ft. 10 in., allowing for a head room of 6 ft. in the lower saloon, and 5 ft. 9½ in. in the upper. Other dimensions may be gathered from the accompanying drawings showing exterior and interior views of the trolley bus.

In reference to the low center of gravity previously mentioned, the tilting angle is 43 deg. when the car is empty and 38 deg. when fully loaded. The absence of undue oscillation when the vehicle is running inspires confidence in the public. A front entrance 33 in. wide is provided on the left, the door being of the double type, opening inward. An easy rising staircase situated near the center of the car body leads from the lower to the upper saloon. The former has seating accommodation for thirty passengers, and the latter for thirty-four, a total of sixty-four on both decks.

Comfort of passengers has been considered in every possible way. All seats have spring cushions, the back rests are padded and the trouble of small knee room has been entirely overcome.

A single-deck car, to seat thirty-two passengers, is made on similar principles by Trackless Cars, Limited.



*English double-deck trolley bus. Seating arrangement of both decks, with side and end elevation*

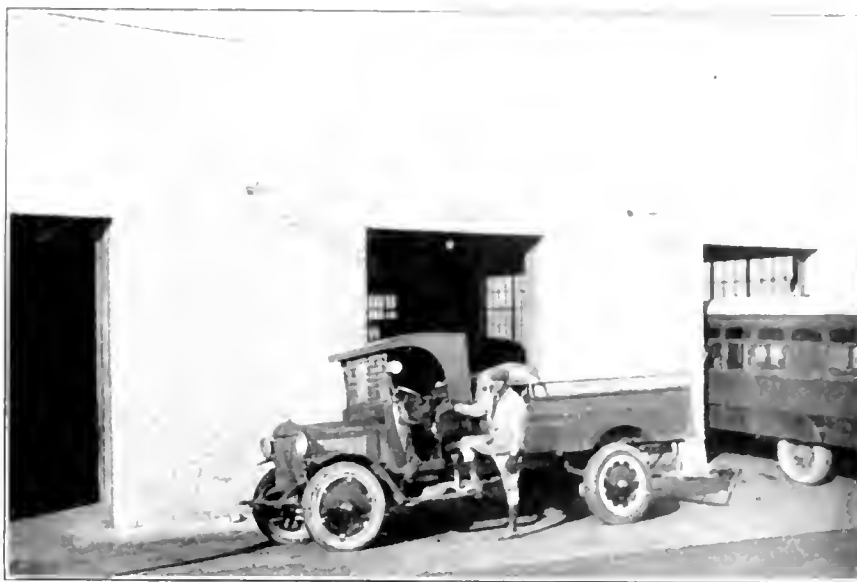
# Maintenance Methods in Nation's Capital

Washington Line Uses Simple Forms for Accurate Records of Repair and Tire Expense—Maker Overhauls Engines at Nearly One-third Less than Local Price

**B**OOKKEEPING for the bus operator requires simple, adequate forms, used without fail. It is no good of course to have elaborate forms printed, laboriously fill them out for a time, and then consign them to the junk dealer for scrap paper.

It is fairly easy to handle the white-collar part of the work. Bookkeepers on whole or part time can make ledger entries or recapitulations, or whatever it is they do. The hard thing is to start at the beginning, and get the men in the shop to supply the facts on which the bookkeeper can work, and without which his records are so much wasted effort.

The Washington Rapid Transit Company seems to have done this, in a way that should help even bus men operating on a much smaller scale. Of its methods more will be told later in this article. The routes and equipment of this company were described in the January, 1922, issue of BUS TRANSPORTATION. Starting in March, 1921, with ten buses on two routes, there are now being operated thirty-six buses, on eight routes representing some 18 miles of streets. Equipment is standardized on Duplex chassis and Hoover



*The three shop doors permit quick handling of buses. In front Duplex truck used for emergency service*

twenty-one or twenty-two passenger bodies.

These are housed in a modern brick and concrete building, which is located at the terminals of the two most important routes. Here in an unbroken floor space of 75x125 ft. are employed a shop force of thirteen men, of whom eight are on the day shift. This includes a foreman,

three mechanics, a tire man who also runs the Duplex emergency truck, and three washers. At night two mechanics, two helpers, and one cleaner are on duty. The photographs with this article show where these men work.

The drivers are naturally the first source of maintenance information. In Washington these men make writ-



*Tank wagon filling 550-gal. tank. Lubricants stored along wall under "No Smoking" sign*



*Work bench, storage bin, and welding outfit, with men who work behind them*

To make sure that the stores requisition is issued whenever parts are used on a job, a stockroom is maintained, in which about \$15,000 worth of parts and supplies are

Above—Simple form for daily condition report.  
Below—Shop card for instruction to have work done and to record time. Stores requisition form, numbered serially as check. Bus repair ledger form. Tire tag, showing what, where, and when used. Tire record form for entering complete mileages and costs.

Tire mileage and costs are kept by an entirely separate system. The shop record is a tag (3½x6½, heavy manila stock) which is filled out whenever a new or repaired tire is mounted on any of the buses. It will be seen that spaces on the tag are provided so that complete information on mileage, maker's number of old and new tires, and their location,

[illegible]



is recorded. When thus filled in, the tags go to the office, where the card shown (5x8 in., cardboard) is kept for each tire. This gives the working history of the tire, and of any changes or repairs, so that the mileage and costs can be obtained. It is necessary to have all this in detail, because the cost is not charged to operating expense until the tire is ready for the scrap pile. This method, it is believed, amounts to the same thing in the end as if the cost was entered regularly on the customary mileage or time basis.

The repair and tire forms mentioned are of course not the only ones kept by the company. Gasoline and oil are recorded daily for each bus. Revenue is classified to show the income for each bus and each route. But the forms covering repairs and tires are necessarily the most difficult to keep for any definite time or vehicle.

Drivers are not allowed to make adjustments or repairs of any kind.

8 to 9 miles to the gallon, and with the system followed, the oil consumption averages from 160 to 170 miles to the quart.

A number of the Hinkley engines on the older buses are being sent to the factory for complete rebuilding and re-boring. In spite of the fact that the bus company pays the freight to and from Detroit, the work costs almost 30 per cent less than it could be done for locally. During the rebuilding the battery ignition will be replaced with Apollo magnetos, and the timing gears will be changed so they will not suck oil, something that has caused generator trouble.

### Extensive Federal Aid Road Program for 1923

**H**IGHWAY construction will proceed during the coming season on a much more extensive scale than ever before, in the opinion of officials at the Bureau of Public Roads. Not

more road work under contract than was placed under contract last year.

Reports submitted by Federal inspectors from all parts of the country indicate that the states are taking excellent care of the maintenance work on Federal aid roads. There is every evidence that the maintenance provision written into the law two years ago is adequate to accomplish the purpose desired. Arkansas is the only state which has been given notice that it must make repairs or contracts covering the road work will be let by the Federal Government. Realizing that maintenance must be looked after, most of the states have provided a patrol system and are taking scrupulous care of their Federal aid roads.

A large number of individual complaints as to the state of highways are reaching the Bureau of Public Roads. Motorists on encountering a stretch of poorly maintained roadway frequently assume that it is a Federal aid road, but in practically every case it is found at the Bureau of Public Roads that the road complained of is not a part of the Federal aid system. In some states 90 per cent of the roads are built without Federal aid. As a result of these complaints consideration now is being given to a plan whereby all Federal aid roads will be marked.

### Brake Inspection—Your Protection

**T**HE Asbestos Brake Lining Association, a manufacturer's organization with headquarters in New York, has adopted the slogan, "Brake Inspection—Your Protection." This will be used by members in their advertising and on their stationery.

The association offers the following suggestions to keep brakes in good working condition:

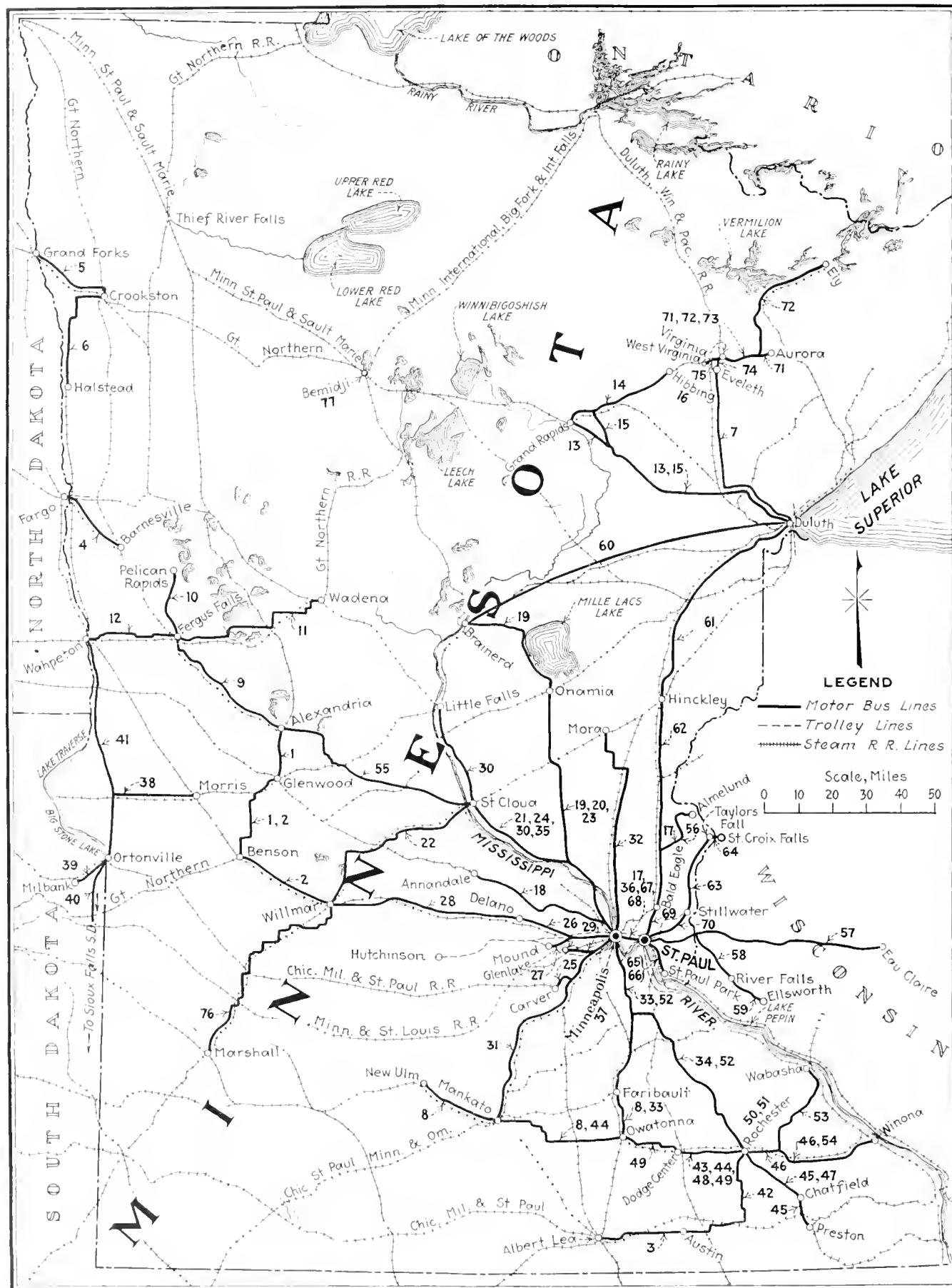
1. Inspect brakes every thirty days.
2. Keep the right and left wheel brakes operating with equal pressure.
3. The brake lining should be kept clear of oil, grit and metal particles.
4. Have the brake lining cleaned with gasoline every three months.
5. Glazed spots on the lining should be removed.
6. Tighten nuts, rivets, etc., at regular intervals.
7. The foot pedal and hand lever should be kept in proper position.
8. Both brakes should be tested before starting.
9. Apply the brakes slowly as a rule, but use them quickly when necessary.
10. Your brakes should be adjusted so that in an emergency you can slide the wheels.
11. Use engine as brake on hills.



*Overhead hose connection, with swivel connection, for washing buses. This work is done during the day, whenever buses are off duty*

The emergency truck goes out whenever a tire replacement is required, and if necessary will replace units, such as rear axles, on the street. Buses are fueled and oiled each night at the shop, the gasoline being dealt out from a 550-gal. tank, which tank trucks fill twice daily with Crown gasoline. It is planned to install another fuel tank of the same size in the near future. Oil is kept in drums, Mobiloil A or B being used in winter and summer respectively. Each day about two quarts of fresh oil are added to the crankcase, and once a month it is cleaned out entirely. Fuel consumption is about

only is the amount of Federal aid money available 30 per cent greater than the amount available last year, but there are large balances from previous years which will be put under contract from this time forward. A portion of that amount will be lost if it is not put under contract before July 1. Since it is improbable that any state will allow any of its Federal aid money to revert to the Treasury, it is expected that an unusual amount of work will be put under contract, particularly in the Southern states. If Florida is to catch up with the road-building program it will have to put 900 per cent



Minnesota's bus activities center largely around the Twin Cities, St. Paul and Minneapolis. All told, there are ninety-six routes in the state totaling about 3,700 miles in length over which 250 buses are operated

# Bus Operation Growing in Minnesota

**A**UTOBUS transportation in Minnesota emerges from the formative period of its development—the year 1922—with a considerably wider vision of the problems of motor bus transportation. This knowledge, however, has been acquired at great expense by the majority of bus operators. The total absence of any state control over bus transportation which by the issuance of licenses or permits would have placed a reasonable restraint upon “pirate” competition has been the principal origin of these problems. Combined with this has been the inevitable result of an active publicity campaign in the interest of good roads in Minnesota, and many men meagerly informed and without adequate capital plunged into the motor bus field and seized upon an untried and untested route, only to find it was not immediately lucrative. Then finding their working capital rapidly diminishing, they would either sell their equipment or establish themselves on a proven route at the expense of a pioneer company.

Concrete evidences of this condition may be found on two routes which operate out of the Twin Cities. One route which is 15 miles in length, and over which half-hour service was offered by the original company developing it, was subjected to competition from three other outfits at one time, two of which offered practically the identical service with touring cars that the motor bus company offered with its buses. The other route which is 70 miles in length has four competitive outfits, one of which advertises \$1.35 as its one-way fare.

The first bus route scheduled in Minnesota was established in 1908 on the Mesaba Iron Range by Eric

**I**MPROVED roads allow the use of larger vehicles, and the limousine type of bus is replacing the touring car heretofore so largely used on the graveled intercity highways. The many lakes in Minnesota prove a mecca for summer visitors and a big inducement for bus operation. The severe winters make operation for four months difficult and expensive.

Wicklund of Hibbing. The railroad service has been and even today is generally considered inadequate and most of the cities on the Iron Range are reached by branch lines. Mr. Wicklund conceived the idea of connecting up these cities or branch line terminals, as they might be regarded, with an auto bus system. His idea continued to grow and today the Mesaba Transportation Company represents the largest motor bus inter-

plan of road development became active, which was in the spring of 1921. The Babcock good roads plan was to put into passable condition and under constant patrol a 7,000-mile system of trunk highways which would be of equal benefit to all sections of the state. While the total mileage of Minnesota roads is 107,103 miles, the 7,000 miles selected for improvement by the Highway Commission, combined with a number of state aid roads, constitutes a chain of maintained highways reaching into every corner of the state.

According to the Bureau of Public Roads, United States Department of Agriculture, Minnesota now has 82,660 miles of improved road not including that added during the 1922 season. The improved road mileage at the beginning of 1922 was as follows:

Graded and drained	65,755
Sand-clay	3,975
Gravel, chert, and shale	12,188
Water-bound macadam	169
Surface-treated macadam	75
Bituminous macadam	19
Sheet asphalt	9
Bituminous concrete	100
Cement concrete	350
Brick	10
Wood block	10



*Type of bus largely used by Boulevard Transit Company on its lines to Carver and Willmar*

ests in the state. Not far from this date a motor bus line between Minneapolis and St. Paul was established and then several lines developed to the lakes and recreational centers near the Twin Cities.

Real impetus was given to the auto bus in Minnesota when the Babcock

In 1914 the total road mileage was 93,517 miles, and during the seven-year period from 1914 the graded and drained mileage has increased from 15,378 to 65,755 and the surfaced and paved roads from 3,968 to 16,904 miles. Deriving its funds from the revenue on state licenses this highway commission is rapidly bringing Minnesota roads

into excellent condition. In the sixteen months during which the commission has been operative it has undertaken 500 separate improvements in the way of road construction and reconstruction and has increased the paved roads by 241 miles and the graveled roads by 2,261 miles. The following table

shows the condition of Minnesota roads at the time the commission was founded and their present condition.

### State Record on Trunk Routes

Miles	At Start	By State	Totals
Graded .....	1,499	2,261	3,760
Graveled .....	1,571	2,246	3,617
Paved .....	112	241	353

All exclusive of 982 miles of reshaping and 80 miles of regaveling and regular maintenance.

A comparison of the figures of this table and those of the statistical table, would indicate that all of the paved roads, a very large percentage of the graveled roads, and even some of the graded but ungraveled roads, are being utilized by the auto bus operators. It is natural for the type of road to be reflected in the style of bus which is most popular. And as

the roads are being improved the style of bus is undergoing a similar evolution.

The prevailing type of vehicle over paved roads has been and remains the motor bus, while over the graveled roads the touring car type predominates in popularity. With the improvement in roads the limousine type is replacing the cur-

## Statistical Information Concerning Motor Bus Operations in Minnesota as of March 15, 1923

Map Key No.	Route	One-Way Distance (Miles)	No. of Vehicles	Seating Capacity		One-Way Fare	Minimum Fare	Fare Basis	Rate per Mile (Cents)	Aver. No. of Round Trips per Day	Normal Outside Time		Running Time	Headway
				Buses	Touring Cars						A.M.	P.M.		
1	Alexandria to Benson .....	75	4	14		\$3.75	*	D	5.00	1	7:00	*	5 hr. 55 min.	.....
2	Willmar to Glenwood .....	65				3.25	*	D	5.00	1	8:00	*	3 hr. 30 min.	.....
3	Austin to Albert Lea .....	22	1	12		1.00	*	D	4.55	3	7:45	2:45	50 min.	Irregular
4	Barnesville to Fargo, N. D. ....	25	1	*		1.25	*	D	5.00	2	7:00	1:00	1 hr. 15 min.	Irregular
5	Crookston to Grand Forks .....	25	1	15		1.25	*	D	5.00	2	*	*	1 hr. 30 min.	.....
6	Crookston to Halstead .....	38	1	15		1.90	*	D	5.00	2	*	*	2 hr. 5 min.	.....
7	Duluth to Eveleth (2 operators) ..	53	14	12-21		*	*	*	*	*	*	*	*	*
8	Faribault to Mankato and New Ulm ..	65	3	14		3.80	50	D	*	2	7:00	8:45	3 hr. 5 min.	Irregular
9	Fergus Falls to Alexandria .....	52				2.70	*	D	5.20	1	7:05	8:55	3 hr.	.....
10	Fergus Falls to Pelican Rapids .....	22	2	18		1.20	*	D	5.45	1	7:05	8:55	1 hr. 20 min.	.....
11	Fergus Falls to Wadena .....	60				3.25	*	D	5.41	1	7:05	8:55	3 hr. 40 min.	.....
12	Fergus Falls to Wahpeton S. D. ....	30				1.55	*	D	5.17	1	7:05	8:55	1 hr. 45 min.	.....
13	Grand Rapids to Duluth .....	90		12		3.25	*	D	3.61	1	9:00	3:00	3 hr. 30 min.	.....
14	Grand Rapids to Hibbing .....	40	28	18		1.50	*	D	3.75	15	7:00	2:45	2 hr. 30 min.	Irregular
15	Hibbing to Duluth .....	90		20		2.75	*	D	3.00	4	9:00	6:00	3 hr. 15 min.	Irregular
16	Hibbing local line .....	5		22		0.10	.05	D	2.00	*	5:30	1:00	15 min.	5-10 min.
17	Minneapolis to Mound .....		*	*	*	*	*	*	*	*	*	*	*	*
18	Minneapolis to Annandale .....	60	2	20		2.00	*	D	3.33	3	8:00	5:00	2 hr. 55 min.	Irregular
19	Minneapolis to Brainerd .....	134		14		4.25	*	D	3.17	3	7:30	5:30	5 hr.	Irregular
20	Minneapolis to Onamia .....	97	19	17		3.45	*	D	3.84	3	8:00	5:00	4 hr.	Irregular
21	Minneapolis to St. Cloud .....	68		19		2.00	*	D	2.94	11	7:30	9:00	2 hr. 25 min.	Irregular
22	St. Cloud to Willmar .....	47		20		2.15	*	D	4.58	1	7:30	*	3 hr.	.....
23	Minneapolis to Brainerd .....	140	1	*	*	*	*	*	*	*	*	*	*	*
24	Minneapolis to St. Cloud .....	70	3	*	*	2.25	.35	D	3.22	4	8:00	8:30	2 hr. 30 min.	Irregular
25	Minneapolis to Carver .....	32				1.00	*	D	3.13	2	9:15	5:30	1 hr. 30 min.	Irregular
26	Minneapolis to Delano .....	29				0.95	*	D	3.27	4	8:00	5:10	1 hr. 15 min.	Irregular
27	Minneapolis to Mound .....	28	7	17-22		0.65	*	D	2.32	7	9:00	1:00	1 hr. 15 min.	Irregular
28	Minneapolis to Willmar .....	98				3.00	*	D	3.06	2	8:00	4:00	4 hr.	Irregular
29	Minneapolis to Glen Lake .....	16	1	*	*	0.25	*	D	1.56	5	8:40	10:10	45 min.	Irregular
30	Minneapolis to Little Falls .....	103				2.25	*	D	2.18	1	*	5:00	4 hr.	.....
31	Minneapolis to Mankato .....	70	2	22		2.00	*	D	3.54	3	8:00	6:00	4 hr.	Irregular
32	Minneapolis to Mora .....	85	2	16		3.00	*	D	3.54	2	8:30	5:30	4 hr.	Irregular
33	Minneapolis to Owatonna .....	96	2	18		2.00	*	D	2.08	2	8:00	1:00	3 hr. 25 min.	Irregular
34	Minneapolis to Rochester .....	96	4	14		*	*	*	*	*	*	*	*	*
35	Minneapolis to St. Cloud .....	68	2	21		*	*	*	*	*	*	*	*	*
36	Minneapolis to St. Paul .....	10	2	16		*	*	*	*	*	*	*	*	*
37	Minneapolis local line—Marshall St. ....	1	6	2	17	0.06	0.06	F	3.74	54	6:00	12:00	6 min.	10-12 min.
38	Morris to Ortonville .....	52	1	12		2.60	*	D	5.00	1	8:00	*	2 hr. 30 min.	.....
39	Ortonville to Millbank, S. D. ....	12				(a) 75	10	D	5.00	*	*	*	*	*
40	Ortonville to Sioux Falls, S. D. ....	181	4	10-18		7.00	10	D	5.00	*	*	*	9 hr. 50 min.	*
41	Ortonville to Wahpeton, N. D. ....	77				3.00	10	D	5.00	*	*	*	*	*
42	Rochester to Austin .....	50				2.00	*	D	4.00	1	5:15	*	2 hr. 15 min.	.....
43	Rochester to Faribault .....	50				*	*	*	*	*	*	*	*	*
44	Rochester to Mankato .....	91	3	12		3.50	*	D	3.85	1	1:20	*	3 hr. 50 min.	.....
45	Rochester to Preston .....	38				2.50	*	D	6.58	2	10:15	6:25	1 hr. 55 min.	Irregular
46	Rochester to Winona .....	50				2.00	*	D	4.00	2	7:00	1:30	2 hr. 20 min.	Irregular
47	Rochester to Chatfield .....	25				1.00	.05	D	4.00	2	*	9:15	1 hr. 5 min.	Irregular
48	Rochester to Dodge Center .....	21	4	19		0.84	*	D	4.00	3	*	8:40	1 hr.	Irregular
49	Rochester to Owatonna .....	41				1.64	*	D	4.00	2	*	3:50	2 hr.	Irregular
50	Rochester—local line A .....	*	5	17-20		0.05	.05	F	*	*	*	*	10 min.	(b)
51	Rochester—local lines B & C .....	*	4	15-16		*	*	*	*	*	*	*	*	*
52	Rochester to Minneapolis via Zumbrota ..	96	6	15		*	*	*	*	4	*	*	*	Irregular
53	Rochester to Wabasha via Doty (2 operators) ..	56	2	*	7	2.50	*	D	4.46	2	8:00	*	2 hr.	Irregular
54	Rochester to Winona .....	50	3	12		2.00	*	D	4.00	2	7:00	1:30	2 hr. 20 min.	Irregular
55	St. Cloud to Alexandria .....	75	*	*	*	2.40	*	D	3.13	1	8:00	*	3 hr. 35 min.	.....
56	St. Paul to Almaden .....	46	2	10		(c) 2.00	*	D	4.35	4	*	*	*	Irregular
57	St. Paul to Eau Claire, Wis. ....	93	2	20		3.50	*	D	3.76	1	8:00	*	4 hr.	.....
58	St. Paul to River Falls, Wis. ....	32				1.25	*	D	3.90	4	8:00	8:00	1 hr. 30 min.	Irregular
59	St. Paul to Ellsworth .....	47	5	15		*	*	*	*	3	*	*	*	Irregular
60	Duluth to St. Cloud via Brainerd ..	160				*	*	*	*	*	*	*	*	*
61	St. Paul to Duluth .....	170				5.50	*	D	3.23	1	12:45	*	6 hr.	.....
62	St. Paul to Hinckley .....	83	2	11		3.00	*	D	3.62	1	6:30	*	3 hr. 45 min.	.....
63	St. Paul to Taylor's Falls .....	52				2.00	*	D	4.00	2	8:00	6:30	2 hr. 15 min.	Irregular
64	St. Paul to St. Croix Falls, Wis. ....	45	2	21		*	*	*	*	*	*	*	*	*
65	St. Paul to St. Paul Park .....	12	3	15-20		25	*	*	2.50	14	6:15	11:30	45 min.	Irregular
66	St. Paul to South St. Paul .....		13	15-20		*	*	*	*	*	*	*	*	*
67	St. Paul to Minneapolis .....	10				0.25	.25	F	2.50	250	7:00	2:15	40 min.	3½-10 min.
68	St. Paul to White Bear & Bald Eagle ..	14				0.35	*	D	2.50	30	7:00	11:15	45 min.	30-60 min.
69	St. Paul to Stillwater .....	18	2	15-22		0.40	*	D	2.23	8	6:40	6:45	50 min.	Irregular
70	Virginia to Aurora .....	22	4	18	7	0.80	*	D	3.64	1	8:00	*	1 hr. 15 min.	.....
71	Virginia to Ely .....	62				2.50	*	D	4.00	10	*	*	3 hr. 15 min.	Irregular
72	Virginia to Biwabik .....	9	7	15		*	*	*	*	*	*	*	60 min.	.....
73	Virginia to Duluth .....	57	2	11		*	*	*	*	14	7:30	9:30	60 min.	.....
74	Virginia to White, Anderson & West Virginia ..	3	*	*	*	*	*	*	*	10	10:00	10:30	60 min.	.....
75	Willmar to Marshall .....	80	1	12		3.00	*	D	3.75	1	8:00	*	3 hr. 35 min.	.....
76	Benidje local line .....	*	*	*	*	*	*	*	*	*	*	*	20 min.	20 min.

(a) Round trip \$1.25

(b) During a.m., noon and p.m. rush hours fifteen minutes. Normal hours Route B—thirty minutes; Route C—sixty minutes.

(c) Round trip tickets \$3.50 or 12½ per cent reduction.

Note: In addition to the information shown above there are nineteen other organizations operating at least thirty-eight vehicles, twenty-eight of which have a seating capacity of fourteen or more, that cannot be identified as to a particular route.

tained touring car, and likewise the touring car bus is coming into use over roads on which a year ago only a light touring car could travel.

Minnesota offers big inducements for bus transportation in the summer months, for its 10,000 lakes attract nearly a million visitors each season. Offsetting this inducement, partially at least, are the severe winter months, which, though frequently limited to three or four months, cause a tie-up in motor bus transportation; or make operation exceedingly expensive as the highways must be cleared by the bus companies themselves. One auto bus company claims to have expended as much as \$65,000 in the winter of 1921-1922 in clearing its route. The larger bus companies now own their snow-removal equipment, which con-

### General Transportation Statistics for Minnesota

Population (1920 census)	2,387,125
Area in square miles	
Land	80,838
Water	5,824
Cities with population	
100,000 and over	2
50,000 to 100,000	1
25,000 to 50,000	0
5,000 to 25,000	24
Largest city—Minneapolis, population	280,000
Miles of highways outside of cities and towns	167,103
Miles of bus routes approximately	3,700
Number of routes	96
Number of vehicles	257
Open or closed buses	252
Touring cars	5
Estimated bus miles operated per day	30,000
Mileage of electric railways, Aug. 1922	769
Mileage of steam railroads, Jan. 1, 1922	9,114

motor buses is in their application for licenses. All intercity commercial trucks and trailers engaged in commercial freighting, or motor buses of more than seven passenger seating capacity engaged as carriers

This has done away with congestion of traffic in front of the leading hotels.

The Highway Commission assumes the right to dictate to the bus companies, at times of the year when the roads are soft, as to whether or not they shall operate. This has produced some confusion. One bus company which has a mail contract was prohibited from using a state highway for three weeks in the spring of the year, and for each day was penalized by the government for failure to deliver the mail according to contract.

### Brake Drums Reinforced with Steel Bands

**W**ORN brake drums on the model 20-45 White buses, used to supplement street car service by the San Francisco Municipal Railway, are being renewed by metal placed in the form of a ring that is securely fastened to the worn drum by a shrinking fit.

As the worn drums come in ready for renewal, the surface usually has irregularities in the form of ridges that necessitate turning the drum down in a lathe. After turning, the diameter is measured accurately and a steel ring of suitable diameter is made up in the blacksmith shop. This ring is made of stock somewhat heavier than the thickness of metal desired for the drum, and it is thus possible to turn the ring down on the lathe, machining the inside surface to get the exact diameter desired and still leaving a sufficient thickness of metal so that after shrinking the ring to place the outside can also be machined to give the finished drum the same diameter as when new. This renewal is made only when the splined hub is in first-class shape and still capable of being fitted securely to the shaft which drives it.

### 1922 Broke All Records for Road Construction

**A**LL records for road construction in the United States were broken in 1922. Federal aid roads constructed totaled 10,000 miles during this period, and highways without federal aid more than an equal mileage. The federal aid program calls for the expenditure of \$3,000,000,000 in twenty years (\$17,000 a mile). One-third of the proposed system, 60,000 miles, has either been constructed or is under construction.



*On the Minneapolis-St. Cloud line one of the Jefferson Highway Transportation Company's buses is equipped for radio entertainment while en route*

sists of a rotary plow, caterpillar tractor and scraper.

There are three important centers of bus activities in Minnesota. The Twin Cities, Minneapolis and St. Paul, have two bus terminals each with a local association. From these two cities eighteen bus companies operate twenty-eight trips. The center second in importance in bus activity is the Mesaba Iron Range and Duluth. Eight bus companies operate in this group and they offer seventeen trips to the public. In the southern section of the state, Rochester is conceded a center of bus activity. Four bus companies operate nine trips out of Rochester. These three terminals of bus companies are all connected up with bus routes, and while this group comprises the majority of aggressive bus companies, there are many enterprising organizations operating in other sections of the state.

The only state registration of

of passengers for hire have to pay 25 per cent increase over the base tax provided for regulation passenger automobiles. The basis for taxation is as follows:

The rate on all motor vehicles except motorcycles is 2 per cent of value. The value is reckoned:

1. For the first three years of life of vehicle, full list price at factory.

2. For the fourth and fifth years of life of vehicle 25 per cent less than list price at factory.

3. For each year thereafter 50 per cent less than list price at factory.

Minimum tax:

4. For trucks and tractors of 2 ton and over but under 4-ton hauling or carrying capacity, \$30.

5. For trucks and tractors of 4 ton and over carrying and hauling capacity, \$50.

The only supervision over bus operations has been of a local nature. In two cases the local authorities of the two cities have favored the plan of establishing bus depots and have extended liberal exclusive parking rights at the depots.

# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

**T**HE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, April, 1923

## *Say It with Flowers*

**F**LORISTS all over the country have adopted the slogan "Say It with Flowers." Presumably they are prepared to sell flowers for every thought or sentiment that the buyer may wish to express. Using this slogan for his inspiration, perhaps, a bus operator on one of the city lines in Paterson, N. J., has mounted a holder just above the dash at the entrance of his bus. In this holder he carries cut flowers.

Now the flowers in themselves attract business, particularly women shoppers, to whom the line mentioned caters to a large extent.

Then, in addition, the very presence of flowers is likely to indicate a courteous, obliging driver, one who would hardly use such a striking bit of color, unless his bus was well kept, clean and, in fact, inviting outside as well as inside.

The bus operator who puts the "Say It with Flowers" spirit into his work surely is building a real business, one that will increase and multiply, and will show the black figures, or profits, which should be the worthy ambition of every operator.

—[ EDITORIAL ]—

## *Elevate the Bus Business*

**A**TTEMPTS by individuals to secure the approval of the bus applications in the State of New Jersey by unsavory methods and subterfuge are followed closely by the State Board of Public Utility Commissioners. Chairman Osborne of the commission has taken a determined stand against the use of illegal and improper methods to secure the board's approval of municipal permits, and more easily to check authorized operations has furnished plate markers to put on the buses.

Such action on the part of New Jersey's board cannot but meet with the approval of those who have entered the bus transportation business and have established the bus as a permanent and a proper means of transportation. Trafficking in municipal permits in the past has been a serious detriment to the development of bus transportation in the large cities and should no longer be tolerated. Illegal practices and operation should everywhere be discouraged, not only by the bus men in-

dividually but collectively through their associations. Every effort should be made to raise the standard and type of bus operators and drivers. No honest and conscientious bus operator should fear proper regulation which places the bus industry on a higher plane of efficiency, thereby making it a better and cleaner business in public estimation.

Manufacturers of motor buses, dealers and salesmen can also assist in this attempt. They should be particularly careful in their dealings to eliminate the type of individual who appears unreliable and unqualified financially to enter the transportation field. State commissions and regulatory bodies should have the co-operation of these manufacturers and others engaged in the promotion and sale of motor bus equipment, for irregular transactions must surely militate against the best interests not only of bus men but also of the motor bus industry.

Success comes only from co-operation with the public and regulatory bodies, backed up by honest and efficient business methods on the part of the manufacturer and operator.

—[ EDITORIAL ]—

## *Buses Have a Place in City Transportation*

**R**ECOGNITION is constantly increasing of the place of the bus in the scheme of city transit. That this is true is evidenced by the recent activity to secure bus operating rights in the cities of Philadelphia, Buffalo, St. Louis and Los Angeles and the projects that have been announced for supplying passenger transportation service by bus in New Orleans and Pittsburgh.

The historic example of city bus transportation on a large scale in America is, of course, the Fifth Avenue Coach Company in New York. Aligned with that company now in the permanence of the service which it furnishes are the Chicago Motor Coach Company, the Detroit Motor Bus Company, the Baltimore Transit Company, the Washington Rapid Transit Company and others. Ambitious plans are now under way for extending the service of the Chicago company.

In this connection it is interesting to record that the Illinois Commerce Commission has taken formal note of the right of the bus to a place in the transportation scheme, and that in New York City the New York Transit Commission is on record as favoring bus operation. The quarrel of the New York commission with the Hylan plan was not with the basic idea of the use of the bus, but with the method of operation under the Hylan régime. The New York City administration, on the other hand, contends that the emergency bus service now being given would be more nearly adequate if it were not hampered by political conditions.

In Philadelphia both the Philadelphia Rural Transit Company, affiliated with the Philadelphia Rapid Transit Company, and the Keystone Bus Transit Company have submitted offers to operate. The offer of the traction company, all things considered, appears to be the more attractive, but it is for the people of Philadelphia to say what shall be done. In Buffalo there is a somewhat sim-



ilar situation. In St. Louis the United States Bus Transportation Corporation appears to be alone in its bid for operating rights. The New Orleans proposal has not yet taken definite form. This is true also of the Pittsburgh proposal.

It is not intended to convey the idea that this summary exhausts the number of proposals in contemplation in the large cities. The instances referred to are cited merely to call attention again to the growing recognition of the place of the bus. So far as the traction companies are concerned, there are now more than eighty such companies operating buses. Among the most notable examples of city operation of buses by such companies are the Baltimore Transit Company, the Northern Ohio Traction & Light Company in Akron, the Youngstown Municipal Railway in Youngstown and the San Francisco Municipal Railway. The case for the bus has been stated too often before to need reiteration. Even the proposal of the Saginaw-Bay City Railway to re-establish railway service in Saginaw carried with it a plan to use the bus.

Not all the proposals now under consideration may be wise from the standpoint of the transportation engineer with respect to routes covered, fares or other details, but the fact that such proposals have been made show to what extent the idea of making greater use of the bus has taken hold.

—EDITORIAL—

### *Progress in Stage Maintenance*

**S**TAGES of the long-body type used on long runs in the West cover large mileages at comparatively high speeds. Keeping up regular service on such systems means mechanical maintenance of a high order—a goal that is being achieved very creditably by the more successful Western systems. The article in this issue describing maintenance methods on the California Transit system shows how problems typical of such conditions are being worked out and reflects the tendency of Western maintenance departments not only to manufacture their own parts to a considerable extent for reasons of economy, but also to redesign in order to secure simpler and more rugged equipment. Occasionally designs are developed that are better for all purposes than the standard design. The wise manufacturer is on the alert for such improvements and is not above adopting them as his own.

High maintenance methods only are not enough; they would be of little avail without effective inspection and an appreciation on the part of every employee that he must take personal responsibility for his work. With such a system in operation delinquencies bring warnings, such as the "notice of tire abuse." In such an atmosphere the careless man is soon eliminated, while the careful man takes pride in having a good record appreciated.

A systematic plan of organization that takes advantage of teamwork and leaves nothing to chance is perhaps more needful in the motor carrier industry than in other transportation utilities. Even the small organization that can afford only necessities will find it worth while to study the

methods that are making for success in the shops of the larger progressive systems. The rapid progress of the industry and the ability to maintain schedules with safety, despite the complex mechanism of the modern automobile stage, is largely due to the courage and forward thinking in the management of the larger companies, of which the California Transit Company is one.

—EDITORIAL—

### *Road Safety with Bus Equipment*

**T**HE bus operator has a personal responsibility to the highway using public in general and to his own passengers in particular in respect to safety. Statistics show that most of the motor vehicle accidents have a personal cause, that is, the driver of the vehicle or the pedestrian using the highways are primarily at fault. Of course, this applies to accidents involving all the different types of motor vehicles, and undoubtedly would not hold for the vehicles used in bus service. Here the equipment is likely to be just as important a factor as any other.

Road safety from bus equipment is tied up with both its original design and with the care given it by the operator. The precautions to be taken were well emphasized in an address delivered several months ago by A. L. McMurtry before the New York Section, Society of Automotive Engineers. Mr. McMurtry, who was formerly the chief official for the enforcement of motor vehicle laws in the state of Connecticut, said that safety indicated the necessity of better tire chains, more effective drivers' mirrors, larger area of braking surfaces, lights to show width of vehicles, reliable direction signals—to mention some of the things he named.

The responsibility for the condition of the vehicles is up to the operator, and Mr. McMurtry also called attention to the absolute necessity for keeping lighting devices and mechanical units always in good condition.

The man who operates a bus stands out among all users of motor vehicles. Thus the bus operator, the driver and the owner as well, should be a leader in the observance of common-sense rules that will not only increase the utility of the highways but will also cut down the enormous number of accidents now being reported.

—EDITORIAL—

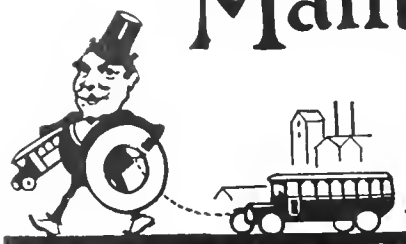
### *Table of Specifications Enlarged*

**W**ITH this issue, an important addition is made to the table of chassis specifications, which is regularly included in the Manufacturers' Section of BUS TRANSPORTATION.

The table, representing as it does a summary of the fundamentals of bus chassis, now contains such details as the make of starter and generator, and make and size of battery.

This recognition of electrical equipment is well deserved, for during the last year it has come to form one of the most essential chassis parts.

The table itself thus gains in value to the operator by giving him a better view of the different chassis available for bus service.

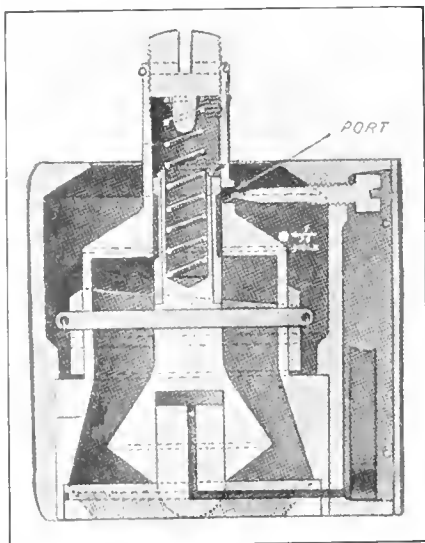


# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Speed Controlling Device

**T**HE K. P. Products Company, Inc., New York, N. Y., has developed the K. P. governor, a device said to eliminate over-speeding without loss of power. This governor is of the velocity type and is arranged



*Cross-section of K.P. governor, screws at top (above plunger) and on right-hand side control vacuum pressure.*

for mounting between the carburetor and the intake manifold.

The outer housing of the governor contains a bell-shaped housing, in which a small plunger moves. This plunger carries a sleeve valve on the outside of the bell-shaped housing, and opens and closes a valve in the housing. By this means the mixture passing through the intake passage is admitted. The impact of the mixture plus the vacuum pressure, working in harmony, are said automatically to operate the governor throttle and to control the speed at any desired point.

Two adjustments are provided. The main speed control is by means of a small screw, set above the spring in the main plunger. One turn of this screw varies the engine speed about 75 r.p.m., the exact amount depending on the engine. Finer speed adjustment is provided by the

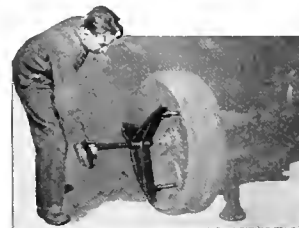
tapered screw shown at the right-hand side of the illustration. This regulates the size of the porthole opening, and therefore of the exposed surface on which the manifold vacuum can act. By a few turns of this small screw any tendency of the engine to hunt or surge can be completely eliminated, states the maker.

## Removing Rotating Parts

**T**HE Crane Puller Company, Arlington, Mass., specializes on tools for removing rotating parts from their shafts. Flywheel gears, cams, brackets, joints and similar parts, also road wheels, can be removed by the pullers which are made in various sizes, according to the work required. The small sizes have two arms, the larger have three, as shown in the illustration. The locking arms for this heavy duty puller are made in two lengths, 7 in. and 11 in., and are adjustable so that different diameters of work can be handled.

The screws are machined from

square steel bars and then case-hardened. A tool steel point is placed in the working end of the screw to engage the center hole of the shaft against which force must be exerted. If there is no center hole,



*Crane puller for heavy-duty service*

the point will center itself on the shaft, it is said.

A number of attachments for the puller are available, these including stud forks for removing solid web flywheels or gears, separate jaws to grip heavy wheel spokes, and pipe bending fixture for straightening shafts.

## New Hollow-Center Tire

**T**O MEET the demand for a tire with the riding qualities of the pneumatic and the mileage and free-from-attention characteristics of the solid type, the Kelly-Springfield Tire Company, New York, has brought out the Aircore tire. Its hollow center, shown in the sectional view, resembles a spear head. On the outside of the tire deep notches are cut



*Side-wall notches of new type cushion tire, and Aircore tire in silhouette. The dotted line represents bottom of notch cut in side wall.*

in the tread and side walls, these being staggered. Each contains a series of pebble ejector steps, intended to prevent the accumulation of mud or stones.

It is said for this type of construction that the notches on the outside

## Bus Brakes

**A** MAKER of brake lining estimates that, on an average, a bus is relined about four times a year and that each relining takes about 6 ft. of brake lining.

This is way low for many operators, particularly when you consider that on an average bus the 6 ft. allowed is practically all needed on one of the four brakes using lining.

But anyway it goes to show the importance of selecting good lining, so as to strike a balance in cost between soft and hard products. Soft linings mean expense in changing frequently; hard linings mean expense in replacing or repairing brake drums.

But with brakes, as with many other parts of the bus:

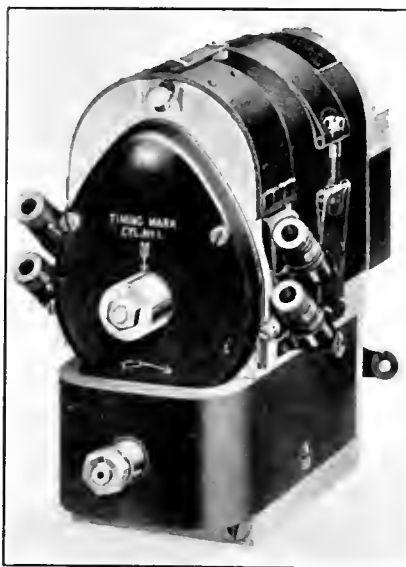
Safety first, then economy.

permit the flow of rubber into them from the adjoining blocks, and thus the traction wave is eliminated; the central opening, by supplying a displacement space, permits a deflection of  $\frac{1}{2}$  to  $\frac{3}{4}$  in. under normal load, which equals the average deflection of a properly inflated pneumatic tire. The spear-head shape of the hollow center is such that it retains its shape under different loads, so that there is no sharp bend or break in the rubber.

### Magneto and Lighting Generator Combined

**A**N INSTRUMENT consisting of a magneto ignition system and a compact generator is furnished by the Eisemann Magneto Corporation, Brooklyn, N. Y. The generator sits above the magneto and is driven by an intermediate gear, which at the same time acts as a distributor for the ignition system.

The magneto is practically of the same construction as the Type G-4 Eisemann, with slight modifications to permit the installation of the generator. The weight complete is only 24 lb., about 35 per cent in excess of the weight of the standard magneto alone. Installation is the same as



*Eisemann magneto-generator unit, on single base with generator on top.*

for the standard magneto, since the shaft diameter, height and distance from base holes are the same. The maker strongly recommends, however, that the top of the generator be kept as far away as possible from the exhaust manifold or pipe, and also that room be allowed for the removal of parts requiring inspection.



*New type of twenty-five passenger bus put out by Indiana Truck Corporation.*

The generator output is rated at 80 watts, the unit giving about 12 amp. on the 6-volt system. Third-brush regulation is used, to prevent the output rising to a dangerous value. A cut-out relay is mounted on the machine so as to prevent discharge of the battery through the generator. Cut-in speed for the generator is from 425 to 450 r.p.m. of the engine. The machine is designed for the single wire system, so that it is a simple matter to connect up outside lights.

### Indiana Announces Twenty-five-Passenger Bus

**T**HE accompanying illustration shows the Indiana Overland bus, a product of the Indiana Truck Corporation, Marion, Ind. The body is of the cross-seat type with accommodations for twenty-five passengers, and lengthwise seats over the rear wheel housings. It is built up of hardwood framing, sheet-steel panels, eighteen-gage, and beaded ceiling  $\frac{1}{2}$  in. thick. The floor is tongued and grooved hard pine, arranged so that it is only 24 in. above the chassis frame. This gives a total loading height of floor at passenger entrance of 33 in.

Following are the general dimensions (in inches) of the body:

Length, dash to rear	202
Height, top of floor to ceiling at center	76
Inside width at cushions	84 1/2
Over-all width	89 1/2
Length of cross-seats	32
Width of aisle	20
Length of seats over wheel	51
Length of rear seat	84
Height of cushions from floor	17 1/2
Height of cushion-back from floor	32
Width of cushions	16

Included in the body equipment are seats upholstered with imitation leather, six 21-cp. dome lights, pilot lights at front, step light, Utility exhaust type ventilators with metal adjustable shutters, sign box at front with lights, push buttons at each

side post, driver's curtain, and heaters fitted under each front cross-seat.

The chassis is the model 25 Indiana with 192-in. wheelbase. Truss rods are used to reinforce the frame. Fuel is supplied by the Stewart vacuum system from a 30-gal. tank placed under the body on the left-hand side; the four-cylinder engine is of the company's make, with 4 1/2 in. bore and 5 1/2 in. stroke. Other equipment includes Stromberg carburetor, McCord radiator, Eisemann magneto, Westinghouse starting motor, Remy lighting generator, Willard 175-amp.-hr. battery, Borg & Beck clutch, Brown-Lipe four-speed gearset, Sheldon front and rear axles, the rear of the worm type, Wolhrab steering gear, and Budd disk wheels with 36x6 front and 36x6 dual rear tires.

### Easy Riding for Buses

**T**HE Supplementary Spiral Spring Company, New York, N. Y., is offering its series multiple device as a remedy for the condition that ex-



*Auxiliary device for use with main spirals.*

ists in heavy-duty vehicles subjected to wide variations in load.

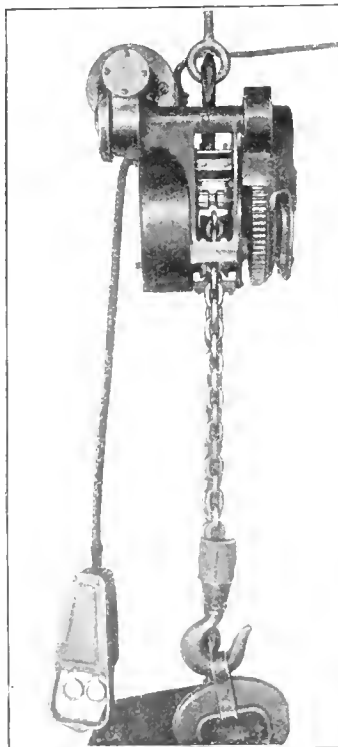
The device, as shown in the drawing, includes a semi-elliptic spring with the ordinary eye at one end and a special seat at the other. On this inspection,

rests the top of the clip which takes the place of the spring link, to connect the spring to the spring hanger. Included in the device are two spiral springs, one under compression at no load and the second carrying the working load.

The 20-in. leaf and spirals, complete per bus, weigh but 100 lb. and are said to eliminate 200 or 400 lb. of leaf springs. The device can be used with the ordinary springs, although the weight saving is not so great. There is still a considerable advantage claimed of improved riding, even though solid tires are used front and rear.

### Motor-Driven Hoist Connected to Light Circuit

**A**N ELECTRICALLY operated chain hoist, known as the Motorbloc, has been placed on the market by the Motorbloc Corporation, Summerdale, Philadelphia. The purpose

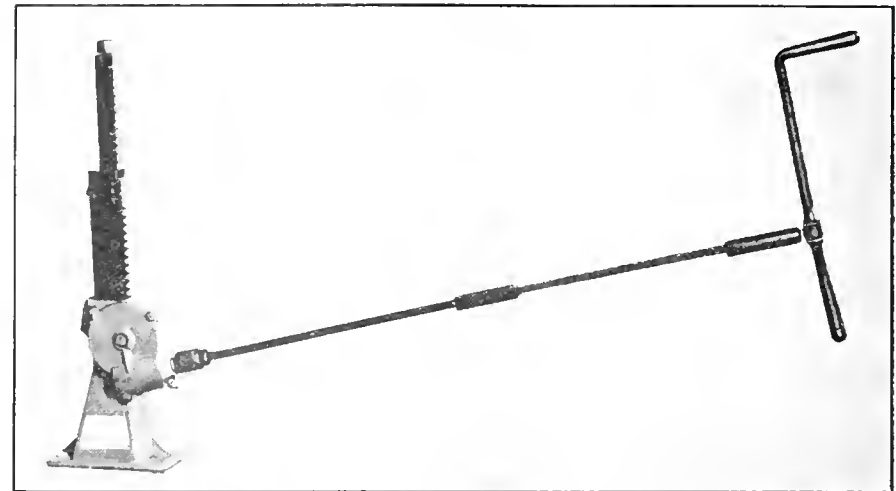


*Electrified chain hoist, with pendant controller, requiring only one hand to operate*

of this is to fill the gap between the standard hand chain hoist and the traveling electric hoist.

The Motorbloc may be mounted on a swinging jib, or on a rail. Current can be obtained through a plug from the nearest electric circuit.

The operation is said to be particularly simple, since a pendant controller requires only the fingers



*Jack with folding handle used to raise, lower, remove and place it in position*

of one hand, leaving the other free to guide the load. Motorbloes are made in capacities from 500 lb. to 10 tons. The 1-ton size complete weighs only 140 lb.

The controller is attached to a malleable iron supporting bracket, in which is included the electrifying unit. This consists of a heavy duty motor, worm and wheel reduction, and a slip friction clutch. The armature shaft on the motor and the worm are carried in ball bearings.

If electric current should not be available, the hand chain can be quickly applied, and the hoist operated as an ordinary block. The chain hoist itself is of the standard spur gear type.

### Bus Jack Has Folding Handle

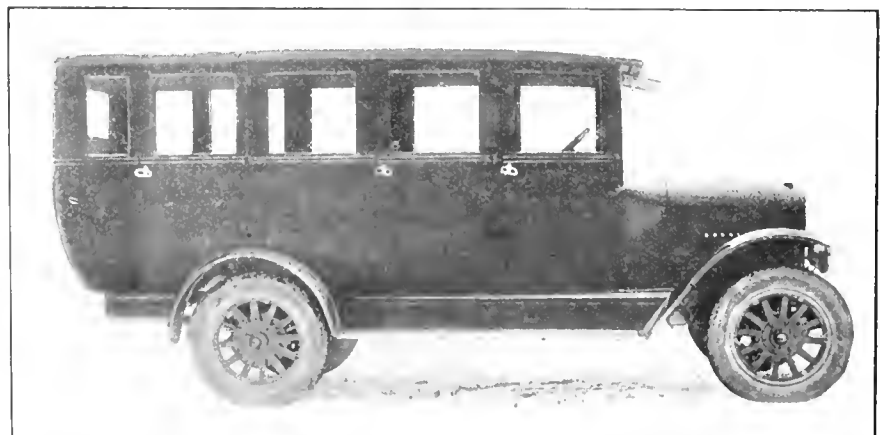
**SHOWN** in the illustration is the No. 2 model jack of the Woods Engineering Company, Alliance, Ohio. This jack is recommended particularly for bus service. It has

a lift of 12 in. and at its maximum position stands 20½ in. above the ground. The handle, which is shown in the operating position, is of the folding type. The capacity of this jack is 3½ tons, and its weight complete is only 15 lb. The material, it is said, is entirely steel or malleable iron; no gray iron is used for any part. Gear and rack bars are machined out, and the thrust end of the driving worm is carried on ball bearings.

### Small-Unit Cross-Seat Bus

**THE** International Harvester Company of America, Chicago, Ill., has developed a twelve-passenger cross-seat bus, mounted on its Model S chassis. The appointments of this bus are said to approach those of the ordinary private passenger car. Because of the cross-seat construction and limited seating capacity, it can be loaded and unloaded quickly.

Inside the width of the body is 64 in., and the length is 134 in. Between the top of the seats a 30-in.



*Twelve-passenger International Harvester bus, mounted on Model S chassis*



*National Easy-Lift jack in position under rear axle of heavy vehicle*

space gives room for passengers. Entrance is through three doors, the rear door taking care of the two rear seats by means of an aisle through the center. There is one door on the left-hand side of the driver. Seats are upholstered in gray Spanish Fabrikoid. Length of the chassis over all is 181½ in.

This unit is recommended to supplement large buses in moving rush-hour crowds, or to take their place when traffic lightens. They also lend themselves very well, it is said, for use in fleets of two and three in small towns or villages.

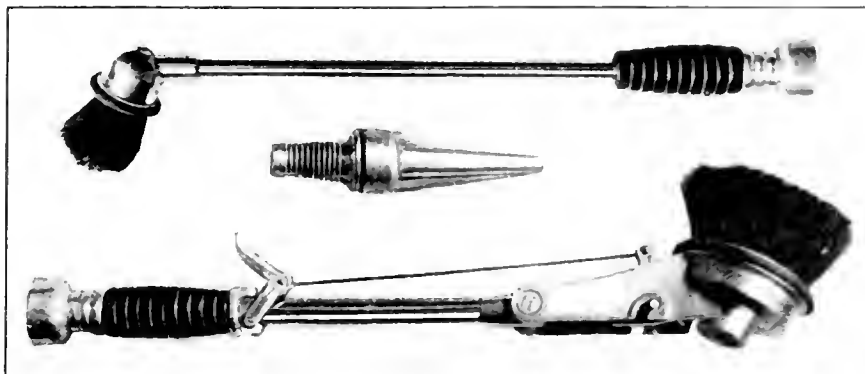
### Washing Set Has Three Sprays

THE Lavoto automobile washing set, made in France and imported by Armin De Gener, Inc., New York, N. Y., consists of three parts as shown in the illustration. The two brushes can be screwed on the end of a hose connection; this

consists of a framework of cast aluminum and brushes of China silk. For washing the body panels and hood, the large brush can be adjusted so as to give a fan-shaped spray or a moderate jet.

The small brush, known as Lavoto, Jr., is for cleaning the spokes of wheels, under the mud guards, springs, in and around lamps, and other parts ordinarily hard to reach. Then there is the lance which gives a strong stream of water, to flush out the floor of the garage or to clean under the vehicle.

The importer states that the water does not come straight through the China silk of the brushes but spreads out from the center so that the turned-over ends are used rather than the tips of the material. By unscrewing a nut the individual tufts can be replaced, and in France the large users, such as taxicabs and bus companies, have the brushes renewed every three months on a contract basis.



*Two sizes of brushes and lance (in center) of Lavoto washing set. Cup on head of large brush for fan-shaped spray*

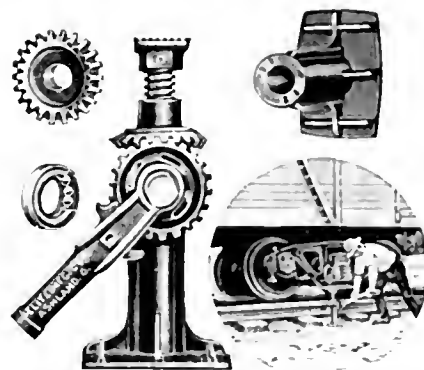
### Long Distance Control of Jacks

A HEAVY-DUTY wheel-type jack, which has the advantage of a handle 80 in. long, is made by the National-Standard Company, Niles, Mich. The No. 66 Easy-Lift jack, as it is called, is shown in the accompanying illustration. With a weight of only 110 lb., it gives a height, down, of 8 to 12 in., and a height raised of from 12½ to 17 in. The material used is malleable iron and steel.

The handle can be moved in a limited space since its movement is communicated to the jack by a ratchet. Another advantage claimed is that when placed under a front axle the handle can be passed under the wheels so that the jack can be used as a truck to guide the vehicle into a new position.

### Ball-Bearing Jack Has 24-In. Handle

OF THE complete line of jacks built by the Elite Manufacturing Company, Ashland, Ohio, the Nos. 28 and 29 are recommended for



*Elite 10-ton jack built for bus service.*

heavy duty bus service. Each has a capacity of 10 tons. A view of one of these jacks accompanies this article.

Stand, gears, handle, handle socket and corrugated top are made from malleable iron. The screw is cut from cold-rolled steel shafting 1½ in. in diameter. The standard pipe handle is 21 in. long, but a longer handle is supplied if required.

The main difference in the two jacks is in the working height, No. 28 having a lowered height of 11½ in. and a height raised of 16½ in., while the No. 29 gives 13½ in. and 20½ in. for the two heights, respectively. Each of these jacks weighs about 20 lb.







# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transporta-  
tion industry.

## Michigan Bus Men Hold Rousing Meeting

Model Bill Drafted and Memorial Sent to Legislature—The Memorial Outlines the Progress of the Industry and Its Needs—Strong Interest and Complete Harmony Characterizes Meeting

AT A meeting of the Michigan Highway Transportation Association, held at the Kerns Hotel, Lansing, Mich., Feb. 13, twenty-eight counties of the state were represented by about 150 association members. The meeting was called to order by President E. F. Moreton. After the minutes of the preceding meeting had been read by Secretary H. H. Hardy and approved the meeting proceeded to consider a bill which had been drafted by the board of directors and the attorneys for the association.

This bill is entitled "An act to regulate the transportation of persons and property for compensation over the public highways of the state by motor vehicles."

### PROVISIONS OF THE BILL

Briefly, this bill provides for (1) Licensing of all vehicles operating over highways for hire, the license to be \$5. Each vehicle so licensed must have painted upon its side the number of the license. (2) Each application for license made to the Secretary of State

must be accompanied by a certificate of indemnity insurance. (3) Each motor vehicle must carry property damage insurance of not less than \$1,000 and personal liability insurance of not less than \$5,000 for any one person injured and of not less than \$10,000 for injuries arising from any one accident. for vehicles seating from thirteen to twenty passengers, the minimum insurance for injuries arising from any one accident shall be \$20,000; for vehicles seating twenty-one to thirty persons, a minimum of \$30,000; for those seating over thirty, \$40,000. (4) Cities or villages may not require any additional indemnity bonds nor insurance other than those provided for in this act nor shall cities or villages prohibit use of streets to any bus line nor impose a license fee to exceed \$5. (5) Licenses may be revoked for reckless driving and intoxication by the Secretary of State. (6) All fees derived from the provisions of this bill shall be turned over to the state for the maintenance of the state highways.

The clauses covering insurance were

not fully decided upon and these were held over for discussion at a later meeting of the association.

At the conclusion of the reading of the bill, there was presented for the information of the association a memorial to the Legislature of Michigan, drafted by Attorney Caldwell. Mr. Caldwell read the memorial and the members were urged individually to see to it that the members of the Legislature representing their districts receive a copy of the memorial and be urged personally to support the association's bill. The memorial is printed in full in this issue.

E. B. Burritt, manager of the National Motor Transport Association, addressed the meeting, explaining the work of the national association, the program which was before it and the plan now actively under way looking to the formation of state associations where none existed, utilizing members of the national association to build up the local organizations.

A resolution was adopted indorsing the work of the national association and the plan of organizing state associations.

The bus section of the association, under the chairmanship of Roy Wolf of Coldwater, numbering about forty-five bus operators, met at luncheon before the main meeting of the association and discussed features of the proposed legislation which had particular bearing on the operation of motor buses.

At a banquet held in the evening 120 members were in attendance, who were addressed, among others, by Clarence E. Bement, general manager of the Novo Engine Company. In speaking on the motor bus, Mr. Bement compared bus lines entering Detroit, which land their passengers at the hotel with the railroads, which invariably leave them out

## Motor Bus Organizations

**NATIONAL MOTOR TRANSPORT ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; manager and secretary, E. B. Burritt, Pisk Building, 250 West Fifty-seventh Street, New York, N. Y.

**ARIZONA MOTOR TRANSPORTATION ASSOCIATION:** President, D. C. O'Neil, Douglas, Ariz.; secretary, F. A. Jones, 127 North Central Avenue, Phoenix, Ariz.

**MOTOR CARRIERS' ASSOCIATION:** President, W. E. Travis, president California Transit Company, San Francisco, Calif.; secretary, James G. Blaine, 1290 Bush Street, San Francisco, Calif.

**CONNECTICUT MOTOR STAGE ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; secretary, Edward J. Gildea, treasurer Congress Taxi Company, Danbury, Conn.

**DELAWARE BUS TRANSPORTATION ASSOCIATION:** President, George A. Moses, treasurer West Chester & Wilmington Transportation Company, Wilmington, Del.; secretary, C. S. White, president Delaware Rapid Transit Company, Wilmington, Del.

**MOTOR TRUCK ASSOCIATION OF FLORIDA:** President, W. T. Callahan, Miami; secretary-treasurer, D. E. McMann, 36 N. W. 1st St., Miami, Fla.

**GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION:** President, E. A. Harrison, Bainbridge, Ga.; secretary, W. M. Riley, Decatur, Ga.

**INDIANA MOTOR BUS OWNERS' ASSOCIATION:** President, H. E. Jahns, general manager Jahns' Bus Lines, La Porte, Ind.; treasurer, W. E. Rentschler, manager Indiana Motor Bus Company, Plymouth, Ind.

**IOWA MOTOR TRANSPORTATION ASSOCIATION:** President, J. Edgington, Des Moines, Iowa; secretary, E. P. Cronk, Des Moines, Iowa.

**MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION:** President, E. Foster Moreton, president Moreton Trucking Company, Third and Howard Streets, Detroit, Mich.; secretary, H. H. Hardy, Fireproof Storage Company, Lansing, Mich.

**MINNESOTA MOTOR BUS ASSOCIATION:** President, Rodney S. Dimmick, president Touring Car Bus Company, 29 Seventh Street, North, Minneapolis, Minn.; secretary, Earl E. Jackson, Endicott Arcade, St. Paul, Minn.

**NEW JERSEY BUS TRANSPORTATION ASSOCIATION:** President, John Morning, 408 Warren Street, Newark, N. J.; secretary, Harry Buecker, 79 Madison Street, Guttenberg, N. J.

**NEW JERSEY AUTO BUS ASSOCIATION:** President, George E. Seymour, Jr., 20 Clinton Street, Newark, N. J.; secretary, George L. Cowan, 20 Clinton Street, Newark, N. J.

**AUTO BUS ASSOCIATION OF NEW YORK STATE:** President, Stanley Chatterton, treasurer White Rapid Transit Company, Lima, N. Y.; secretary and treasurer, James J. Dadd, president Rochester Bus Lines Advertising Corporation, 120 Vermont Avenue, Rochester, N. Y.

**OHIO MOTOR BUS ASSOCIATION:** President, R. E. McCollum, Ohio Motor Bus Company, Columbus, Ohio; secretary, C. J. Randall, 419 Majestic Building, Columbus, Ohio.

**AUTOMOTIVE CARRIERS' ASSOCIATION OF OREGON:** President, Max H. Clark, Camas Stage Company, Portland, Ore.; secretary, J. L. S. Shead, manager Oregon Auto Stage Terminal Company, Portland, Ore.

**PENNSYLVANIA MOTOR BUS OWNERS' ASSOCIATION:** President, Frank Martz, treasurer White Transit Company, Plymouth, Pa.; treasurer, W. J. Emerick, president Emerick Bus Lines, Bellefonte, Pa.

**WASHINGTON AUTO TRANSPORTATION ASSOCIATION:** President, A. C. Ellington, Des Moines Auto Company, Seattle, Wash.; secretary-manager, Erven H. Palmer, Terminal Building, Seattle, Wash.

**WISCONSIN MOTOR TRANSPORTATION ASSOCIATION:** President, A. C. Homan, Menasha, Wis.; secretary, E. H. Kambe, Caswell Block, Milwaukee, Wis.

The stage need call attention to the fact that motor transportation is doing much to develop the state and to give frequent transportation to outlying districts, which in most cases, have no other means of transportation. Any additional tax burden, stage operators claim, will have to be absorbed by the

stage riders through an increase in fares. Without a raise in stage fares and freight rates the operators claim they will be forced out of business if additional taxes are levied.

The operators point out that uncontrolled motor vehicles are not required to furnish indemnity bonds, file rates

and schedules, and are free and unlimited in their activity, while certified operators are not only required to pay for all of these things, but are also required by the state department to operate and maintain schedules, even if they have to send out empty cars in order to obey the regulations.

## Motor Bus Experience in Tulsa, Okla.\*

By B. HILBURN

General Manager Tulsa (Okla.) Street Railway

THE subject of "trackless transportation" is so important that it commands much consideration. I am quite sure that I am not alone in the belief that the time has come when we must accept trackless transportation as a part of the industry. I am also one who believes that as nearly as possible it should be co-ordinated with the established transportation lines. The acceptance of trackless transportation as a legitimate part of the electric railway industry should require that it have the same regulation and bear its just share of taxation and other responsibilities. It is my opinion that the operation of trackless transportation units should not be prohibited, but regulated. If it can be self-sustaining and show profits, when operating as a legitimate business enterprise, and if more satisfactory public service can be performed, then the public is entitled to that class of transportation. It is inconsistent to say that under all circumstances the jitney, the motor bus, etc., cannot perform a satisfactory service. There is no doubt but that a vehicle that loads quickly and reaches its destination rapidly is always going to make a very wide appeal.

We have been engaged in the operation of several motor buses in Tulsa since July 1, 1922. Therefore, you probably will expect something authoritative concerning bus operation. However, we are as much bewildered as A. C. Blinn, vice-president and general manager Northern Ohio Traction & Light Company, Akron, Ohio, expressed himself to be when he recently addressed the Central Electric Railway Association.† We are at present subjected to such a deluge of unregulated and unrestricted competition that our situation cannot reflect accurately what the results would be under other circumstances.

In the fall of 1921 agitation was started for the installation of bus lines, to displace two jitney lines operating into sections that were not served by car lines. Being prevented from building into those sections because of the lack of proper franchise rights, we proposed to the city administration that upon the passage of a regulatory ordinance we would install motor buses on these routes. We practically reached a tentative agreement with the Mayor

and Commissioners, and an ordinance was drawn and presented for passage. However, when the ordinance was presented the Commissioners thought its passage might jeopardize a bond issue which was to be voted on by the citizens, which was to be used for the construction of large municipal water projects. Therefore, the matter was dropped until the spring of 1922. A new administration went into office, which started negotiations with us for the installation of buses to take the place of the jitneys. The Real Estate Exchange, the Chamber of Commerce and other civic bodies expressed themselves as favorable to such an undertaking.

An ordinance was drawn by the City Attorney, and the Mayor and Commissioners agreed to pass it if we would install suitable motor buses. This we agreed to do, and immediately ordered equipment for the installation of four twenty-five-passenger buses on what was known as the East Sixth Street line, commencing July 1. This line is 2.7 miles long, and we started operating on a thirty-two-minute round-trip schedule, providing an eight-minute service with four buses. We soon found, however, that we needed extra buses in the peak hours, and on delivery of three more twenty-five-passenger buses in the latter part of July we instituted the operation of one extra bus in the morning and afternoon rush hours and operated on a thirty-five-minute round trip schedule, affording a seven-minute service.

The jitney operators attempted to resist the enforcement of the ordinances, and on the first of July proceeded to operate in violation of the ordinance. This ordinance practically excluded the jitney or touring car from operation for it provided that all self-propelled vehicles operating over designated routes for hire should be of the motor bus type, with a seating capacity of not less than sixteen including the driver. The ordinance also provided for the filing with the city of an indemnity insurance bond and other reasonable requirements. However, at that time the jitney operators' counsel failed to make a case and their petition for a temporary restraining order to prevent the enforcement of the ordinance was denied.

Another and the most important jitney line paralleled our car line, one block away, for a distance of twenty-five blocks and the city administration

attempted to negotiate with the jitney operators to install buses on this route. The jitney operators would not agree to do that, and the commission then took the matter up with us. Although it meant that we would have to enter into competition with our own car lines, we agreed to install buses. The line was 2.5 miles long, and after making a check of the traffic, we ordered six sixteen-passenger buses and prepared a schedule requiring the operation of the six buses on a thirty-six-minute round trip, providing a six-minute headway, and the addition of four tripper buses for the morning and afternoon peak hours, which provided a four-minute headway. We put the buses on this line, known as the Admiral line, on Sept. 1, and the jitney operators ceased operation without court action. Therefore, on the two lines we were operating fifteen buses, nine of the twenty-five-passenger seating capacity type and six of the sixteen-passenger type. This operation continued without competition through the month of September, and we showed a small profit and rendered a fairly satisfactory service.

On Oct. 3, 1922, the former operators of the jitneys decided again to contest the ordinance and went into court asking for a temporary restraining order, on the ground that the ordinance was in conflict with a state law authorizing jitney service. Their contention was upheld by the court, on the ground that the ordinance specified the capacity. The City Commission then repassed the ordinance, leaving out the capacity requirement, retaining the insurance regulation, prohibiting the carrying of passengers on the running boards, etc. The ordinance was again contested, but the court held the ordinance valid, warning the city against any discrimination in the enforcement, and stayed the enforcement for seven days, to give the jitney operators time to comply with the ordinance. The operators then proceeded to file application for licenses, but failed to file the insurance bonds or to file detailed schedules, and the City Commission refused to license them. They then again went into court and asked for a restraining order, on the ground that the commission was discriminating. This time the court gave them the restraining order, and finally a temporary injunction, preventing the enforcement of the ordinance. This ruling of the court was appealed to the Supreme Court, where it is now pending.

### KIND OF EQUIPMENT USED

We have one Model 50 White chassis, on which is mounted an all steel Kuhlman body, of the twenty-five-passenger seating capacity. The weight of this bus is 8,825 lb. It has only one step between the ground and the floor of the bus, the height of which is 17½ in. The floor height is 29½ in. and the door width 28 in. This is a pay-as-you-enter type. We have nine Model 725 Garford chassis, on which are mounted

\*Abstract of paper presented before Oklahoma Utilities Association, March 12, 1923.

†For an abstract of the paper referred to see BUS TRANSPORTATION for February, 1923, page 99.

Garford built bodies, of wood and steel. They are of twenty-five-passenger capacity, and their weight is 8,550 lb. Except that they have two steps between the ground and the floor of the bus they are similar to the White bus on other body specifications. We have six Model 15-L Garford chassis, on which are mounted sixteen-passenger Garford built bodies. They have one step between the ground and the bus floor. We also have seven Reo Speed Wagon chassis, on which are mounted local built bodies. All told, we have twenty-three buses.

After our eight months of experience we are led to believe that there is yet much to be done to develop the gasoline bus into a practical unit for affording city transportation. They are so much more delicate than the old reliable electric railway car that they require constant attention, which makes the cost of operation per revenue passenger compare very unfavorably with the electric car. Ignition trouble and many minor adjustments constantly interrupt the schedules, causing criticism as well as expense and loss of revenue. We are endeavoring as much as possible to keep the same operators on the same buses because the more familiar the operator becomes with his equipment the less trouble we have in keeping it in operation. However, we follow the same rule in assigning runs as are followed in the operation of the street cars, and seniority prevails. One of our chief troubles is the braking. The constant stopping requires continuous brake adjustment and many pull-ins. As we understand it, that is one of the engineering problems that is attracting much attention from the automotive manufacturers. At the present time we are getting approximately 7,000 miles per set of brake-shoe linings.

All of our twenty-five-passenger type buses are equipped with solid tires on cushion wheels on the rear, with 36 x 6 pneumatic tires on standard wheels on the front. The sixteen-passenger buses are equipped with 36 x 6 oversize tires on the rear and 35 x 5 on the front. We think that we are getting fairly good results with our tires, as we are getting about 20,000 miles per tire, which makes our tire cost about 1.3 cents per bus-mile.

Summing up our operating expense, which is the only thing that we have any definite knowledge of, the statistics show the following cost per bus-mile of operation:

	Cents per Bus-Mile
Tires .....	1.3
Gasoline and oil .....	2.7
Operators' wages .....	5.5
Repairs, maintenance and general expenses .....	4.8
Indemnity insurance .....	1.0
Depreciation .....	2.7
Total operating expense, including depreciation .....	18.0

The first four months of operation was practically free from competition. During that period we operated 180,000 miles and carried 558,085 revenue pas-

sengers, which produced \$34,731.66 gross revenue, which netted \$3,093.91.

I regret that I cannot intelligently discuss the trackless trolley, as it is my opinion that it is the most practical of all railless cars designed to date. However, my knowledge of this type of car is confined almost exclusively to what I have read. It seems altogether probable that the trackless trolley can be more easily co-ordinated with the electric railways, because the maintenance would more nearly fit in with the maintenance of street cars. It is certain that electric energy would be a large item of saving over gasoline for the motor bus. After all, it is my opinion that the motor bus is here to stay, but I am doubtful if it can ever be operated as economically as the electric car and will have a tendency to increase fares. Therefore the permanency of the electric railway seems assured, because the low rate of fare will always be a deciding factor. The public should be educated to the necessity of putting trackless transportation on an equal footing with the legitimate end of the business.

### Conference on Standardization Held in Washington

**W**IDER adoption and increased use of standards in automobile and motor truck construction, particularly as applies to uniform sizes for certain parts, were discussed on March 9 at a meeting in Washington, D. C., of representatives of various interested associations called by the Division of Simplified Practice of the Department of Commerce.

It was suggested that instead of the fifteen sizes of spark plugs now on the market, it might be possible to adopt three sizes which would answer all purposes of service. Another suggestion advanced was that the outside dimensions of battery containers be standardized so that any battery would fit any car.

As a result of the conference, a central committee was decided upon to represent engineers, manufacturers, distributors, dealers, garage operators and service men, owners and users and the trade press to co-operate with the joint committee on simplified practice of the Society of Automotive Engineers and the National Automobile Chamber of Commerce to bring about reduction of excessive sizes. The first subjects to be taken up by this central committee will be spark plugs, roller bearings, storage batteries and tires.

M. L. Hemingway, general manager of the Motor and Accessory Manufacturers Association, was elected permanent chairman of the central committee, and Carey E. Quinn, of the Automobile Body Builders Association, was elected permanent secretary. Each association interested will name one member of this central committee.

A brief résumé of the addresses made by some of the leading men of the automotive field give some very interesting side glances on the growth of

the industry, as well as the application of and necessity for standardization.

C. C. Hatch, vice president of the Lexington Motor Corporation, brought out the necessity of organizing the human side to get better results. He believed that all elements should be brought into the problem and that intelligent co-ordination of these elements will have the necessary influence to effect standardization within the industry. In reciting an example of diversification in it, he stated that during one week he was compelled to use three different types of gear shifts on three different cars, proving that the standard shift as adopted by the S.A.E. is not being adhered to very closely. He was also of the opinion that concentration leading toward standardization should be confined to parts that benefit the user. He made plain the fact that personal appearance of the exterior of the car, design and style, are features that must be left to the art of the manufacturer and to the individuality of the consuming public.

C. F. Clarkson, general manager of the Society of Automotive Engineers, spoke of standardization and the accomplishments thus far of the Society. He emphasized the importance of the S.A.E. standards and their adoption.

A. J. Grimm, chairman of the standardization committee of the Automotive Equipment Association, outlined the origin and development of his association and their efforts along the line of standardization. The handbook of the Automotive Equipment Association now contains the standards as promulgated by the S.A.E. as a guide for manufacturers in their production of accessories. He felt that his association could do a great deal in selling the standards to its manufacturing membership.

A. D. T. Libby of the Automotive Electric Association spoke forcefully upon the necessity of standards within the industry, and laid particular stress upon the electrical equipment standards as adopted by all manufacturers making it possible for any magneto to be readily adjusted to any type of car. The same standards are possible for generators and starters. He suggested questioning the manufacturers as to why the standards of the S.A.E. were not used more generally. If the standards proved unsuitable, or caused greater cost to the manufacturer, they should be changed to meet the situation.

E. E. La Schum, American Railway Express, gave a talk on the durability and reliability of the motor truck. The chief problem that confronted the large users of transportation, he said, was the education of drivers. He favored greater standardization from the maintenance angle, as an unlimited variety of parts must be carried in stock completely to repair a fleet of trucks constantly in operation.

Among organizations represented were the National Automobile Chamber of Commerce; the Motor and Accessory Manufacturers Association;



Automobile Body Builders Association; Automotive Metal Wheel Association; American Gear Manufacturers' Association; Automotive Electric, Motor Truck, Tire and Rim and other associations. Delegates were present representing dealers', equipment, national hardware and other organizations, while large users of motor trucks also were represented.

### Transportation Problems Up for Discussion

**T**RANSPORTATION in All Its Phases in the United States" will be the keynote of the eleventh annual meeting of the Chamber of Commerce of the United States in New York, May 7 to 10, as it is the keynote of virtually every business discussion over the country these days. Already the national chamber is engaged on a comprehensive study of the whole problem from every point of view, hoping to aid in the ultimate formulation of a national transportation policy. That study, however, has been intrusted to a transportation conference created by the national chamber and its conclusions will not be available for months, in all probability. Special committees of the conference, dealing with specific divisions of the general question, will be in session at the time of the annual meeting, and the discussion of transportation subjects at the meeting in New York naturally divides itself into lines similar to the committee work of the conference.

Representatives of the motor industry, the railroads, shipping interests, producers, waterway operators and the public are included in the conference makeup and also will be heard before the annual meeting. The aspects they will discuss at the meeting include governmental relations to transportation, railroad consolidations, rate schedule readjustments, co-ordination of motor transport and waterway carriers.

Elliot H. Goodwin, resident vice-president of the national chamber, has pointed out that the transportation problem was a purely domestic question which "can and must be solved by American business genius." The annual meeting will provide, he says, a far-reaching review of transportation needs.

"No factor in our national life is so universal in its application as the need of adequate means of transporting our goods," according to Mr. Goodwin. "Business prosperity, and that means our greatness as a nation, depends on finding the right way to deal with our carriers by rail or water or highway. Concern in this regard is manifest in every department of our national life, in farming, mining, manufacturing, distribution, and nowhere more than among railroad executives.

"There is necessity for adoption of a national transportation policy.

"Men of the business world feel that there must be a way to harmonize operations of trains and trucks and water carriers to make our transporta-

tion system capable of any expansion that our commercial growth demands. But involved in such a project is all the question of planning for national treatment of transportation, insurance of protection for the proper public interest in railroads and at the same time restoration of confidence among investors in the railroads and their management, revision of the railroad rate framework so that traffic will not be stifled, yet providing such revenues as will make the carriers living, expanding industrial entities.

"It is not to be expected that a transportation cure-all can be evolved overnight at the coming annual meeting of the national chamber. It is to be expected, however, that the meeting will foster and stimulate discussion both among business men and the public. Men who are recognized nationally as authorities on transportation will be among the speakers, and the annual meeting, while not attempting itself to offer a transportation solution, well may have an important influence in helping to develop national thought on this vital subject.

"Proposals for solution of the transportation problem have been varied. Some would turn increasingly to motor truck movement of freight, some to waterway developments. All of these proposals are to be presented before the delegates at New York. The annual meeting will serve the purpose of acquainting thousands of delegates with the ebb and flow of national thought on the whole subject. It will be a stepping-stone to the day of a national transportation policy, to intelligent consideration of the forthcoming conclusions of the transportation conference."

### New York Bus Men Hold Three Meetings During March

**D**URING March three meetings of the Auto Bus Association of New York State were held—at Binghamton on the 15th, Poughkeepsie on the 16th and Newburgh on the 19th. The purpose of these meetings was primarily to interest the bus men of the Empire State in the work of the state association in conjunction with that of the National Motor Transport Association. At each meeting new members were added. Several meetings in different parts of the state are planned for April.

James J. Dadd of Rochester, secretary of the organization, was present at all the March meetings and outlined the progress being made in securing enabling legislation for the formation of a mutual insurance company to be made up entirely of bus men. E. B. Burritt also addressed the various meetings and outlined the aims and work of the national association. C. V. Funk, Ohmer Fare Register Company, spoke at the Poughkeepsie gathering on "The Fundamentals of Fare Collection." C. W. Stocks, editor of *BUS TRANSPORTATION*, at the three meetings pointed out to the bus men the value of co-operative organization from an educational standpoint.

## Highway Transport Franchises\*

BY ARTHUR H. BLANCHARD

Professor of Highway Engineering and  
Highway Transport, University  
of Michigan

**A**LTHOUGH the phrase "Highway Transport Franchise" has not been officially defined, it may be explained as an agreement between a state controlling body and the highway transport operator covering a guarantee of definite service on a prescribed route under stipulated conditions by the operator and a guarantee by the state that there shall not be unwarranted, ruinous competition by other operators.

Highway transport operators carrying on under franchises are motor vehicle common carriers, as they carry indiscriminately, within reasonable limitations, all persons or commodities, under general conditions of agreement applicable to the whole public, on defined routes according to definite service schedules.

The legal right of the state to control the operations of common carriers is generally admitted except in the case of interstate common carriers. At the present time, at least twenty-two states provide in their statutes for some degree of state control over motor vehicle common carriers.

Are highway transport franchises an economic and public necessity? To those familiar with the development of the commercial transportation of commodities and passengers by motor vehicles during the past fifteen years in the United States and the longer history of highway transport in Great Britain, the answer is unreservedly in the affirmative.

Failures of highway transport enterprises are occurring every day due to a lack of knowledge of the fundamentals of the economics, science and art of highway transport.

While 50 per cent may fail due to cut-throat competition by fly-by-night companies, it is conservatively estimated that at least 50 per cent fail because of lack of knowledge of the A B C's of efficient highway transport business methods, cost accounting, management, and the operation and maintenance of equipment.

Those interested in the efficient development of highway transport in the United States have a big task before them in bringing to the attention of groups of business men or capitalists, operators and prospective operators, the necessity of having connected with their operating organizations men who are thoroughly trained in the methods of highway transport, the interrelationship of highway, railway and waterway transport, legislation, the fundamentals of costs and record systems and the principles of highway transport management, together, of course,

\*Paper presented at Michigan Conference on Highway Engineering on Feb. 12, 1923, at the University of Michigan, Ann Arbor.



## The Field of the Trolley Bus\*

This Vehicle Occupies a Position Midway Between the Motor Bus and Trolley Car—While Few Installations Are Yet in Operation, Interest in the New Transportation Plan Is on the Increase

By J. A. QUEENEY

Railway Department, Pennsylvania  
State Highway Bureau

with a knowledge of the mechanism, operation and maintenance of motor trucks, tractors and trailers.

It is absolutely necessary that highway transport be placed upon a sound business basis in order that responsible operators may be protected and that this branch of common carrier service may be conducted in such a manner as will guarantee to the public constant, efficient, economic service.

From the standpoint of public safety, the state must insist that our motor vehicle common carriers transporting passengers provide a maximum degree of safety to the traveling public and eliminate reckless driving by inexperienced chauffeurs, and the utilization of wholly inadequate motor vehicle equipment.

Based on an analysis of all state statutes covering the control of motor vehicle operation, the powers given to state public service controlling bodies may be classified as follows:†

1. Grant, refuse to grant, amend or revoke certificates of public convenience and necessity.
2. Prescribe routes.
3. Fix schedules.
4. Determine character of service and promote the comfort and safety of traveling public.
5. Establish fares and rates.
6. Require reports and uniform methods of accounting.
7. Examine accounts and records.
8. Supervise fiscal affairs such as incorporation, capitalization of stock, etc.
9. Compel additions to, extensions of or betterments in physical equipment.

It is evident that a grave responsibility to the public and to highway transport business will rest upon the members of such a body. They should be men possessing vision, judicial minds, and a broad knowledge of transportation, and should be unprejudiced concerning development of railway, waterway and highway transport. Different fields of public and business affairs should be represented. An efficient controlling body might be made up of the following with the state highway commissioner and the attorney general of the state as ex-officio members; a highway transport man of high standing and possessing a broad knowledge of transportation by motor vehicles; an experienced highway engineer, who understands the fundamentals of highway transport, and a banker who has dealt with big commercial problems and is familiar with the practice of bonding common carriers. To this group of five might be added a steam railroad man and an electric railway man, provided that they possess a broad vision relative to the development of transportation in America.

It may be said that the highway transport operator of sound financial standing, who is endeavoring to render to the public an efficient, economical and safe transportation service, will welcome the passage of state laws relative to highway transport franchises provided that they are based and administered on the principles which have been herein outlined.

IT IS GRATIFYING that the American Institute of Electrical Engineers is taking an active interest in the transportation problem because there is none that more vitally affects the interest of every community.

From time to time we hear it said that the electric railway has outlived its usefulness and that in the near future it will be replaced by the gasoline bus. In my judgment there is no system yet developed that offers any hope of more adequate or efficient transportation for the great mass of people, for our large and medium-size cities at least, than the electric railway.

However, there are conditions in almost every city, regardless of size, where a car or bus operating on rubber tires will prove to be equally dependable and much more economical than the street car. In most such cases the trolley bus will best meet the requirements. When overhead wires cannot be installed or where the headway is very long the gasoline bus will prove more economical.

Until two years ago the trackless trolley as a system of transportation was practically unknown to the American public, although it has been in successful operation in Europe for many years. As early as 1903, however, there were three or four more or less experimental installations in this country, which were abandoned on account of inability to secure a franchise or because the traffic reached the point where the operating companies felt justified in substituting the standard street car.

To demonstrate the operation of a trackless trolley system the General Electric Company secured a trolley bus, put up the overhead wires and operated a trackless trolley at the Schenectady works in June, 1921. Several hundred street railway men from all parts of the country were present at the demonstration. Shortly after the demonstration at Schenectady the city of New York decided to install this system on Staten Island on two routes; one from Mier's Corner to Sea View Hospital, a distance of 2.6 miles, the other from Mier's Corner to Linoleumville, approximately 4½ miles. The cost of overhead line, including poles, all material and labor was approximately \$1,500 per mile. Seven trolley buses were purchased, each seating thirty passengers with standing room for as many more, although on Saturdays and Sundays they frequently carry seventy-five to eighty passengers.

These buses have been in continuous and successful operation since Oct. 8,

1921. They have provided safe, dependable and economical transportation to the people of that section of Staten Island through what they estimate. In fact, during the winter months, when on several occasions the roads were covered with snow and ice, and when the street car operating in the same vicinity failed to perform its regular schedule the trolley bus never once failed to render its regular service. As a consequence the city of New York on Nov. 4 inaugurated trolley bus service on a 10-mile route from Richmond to Tottenville.

The buses on the new route are of the "gas-bus type," that is, they are equipped with a chassis having a car wheelbase, with a hood at front exactly like that on a gasoline bus, the motor being located in the space ordinarily occupied by the gas engine. The city has another trackless trolley route 4½ miles long under construction on City Island. Operation will begin there early in 1923.

Commissioner Grover Whalen of New York City has recently recommended that \$1,325,000 be appropriated for a trackless trolley system to comprise approximately 120 miles of route with power station, substations and 125 buses.

Since the opening of the trackless trolley route on Staten Island a line about 6½ miles long has been placed in operation by the United Railways & Electric Company of Baltimore.

There are two other trackless trolley lines in this country; one in Minneapolis operated by the Twin City Rapid Transit Company and the other in Los Angeles operated by the Los Angeles Railway. Both are short routes with one bus each installed chiefly to demonstrate to the railway officials and city authorities the operation of this system. However, the Twin City Company has now under construction a second trolley bus.

The Virginia Railway & Power Company was the first of the street railways to adopt the trackless trolley, and demonstration lines were in operation in both Richmond and Norfolk prior to the opening of the first Staten Island routes. Due to difficulty in securing franchises actual operation has been delayed, but definite arrangements have now been made with the authorities in Petersburg for operation and two buses which are now under construction will shortly be placed in operation. Additional buses will soon follow, as the officials of Petersburg and those of the city agree that the transportation needs of the people of Petersburg can best be served by this form of transportation. As soon as franchises can be drawn up,

\*Report by Motor Vehicle Conference Committee, March 1, 1922.

\*Abstract of paper presented before Philadelphia Section, A.I.E.E., Nov. 13, 1922.

the company will also make installations in Richmond, Norfolk and Portsmouth.

The officials of the New York State Railways and the street railway commissioner of Rochester have come to the conclusion that the trackless trolley furnishes the means best suited to supplement the present trolley system in Rochester, and plans are now under way to install a route to tie together several of the street car lines. There are also two trackless trolley routes in operation in Canada; in Windsor and Toronto, each with four buses.

The operating cost of the trolley bus is approximately 19 cents per bus-mile or about the same as that of the Birney safety car, which is undoubtedly the most efficient and economical car yet developed for urban transportation.

The trolley bus operates with very little noise and vibration. Its acceleration is rapid and smooth. Slower moving vehicles and other obstructions can be passed, passengers can be taken on and discharged at the curb—in short, faster schedule speeds and more dependable service are possible than with cars operating on rails.

## Regulation of Motor Vehicles in Iowa\*

By C. W. EBY

Assistant Chief Engineer  
Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa

TEN years ago the Iowa State Highway Commission was created to provide plans for highway construction, including bridges, and to supervise construction and maintenance of the highways of the state. The sphere of activity and volume of highway work looked after by the commission have increased every year, until in 1922 nearly \$12,000,000 was expended on the highways. Iowa now has many miles of paved highways and first-class gravel roads, and a comprehensive program has been entered upon for rapidly increasing the mileage of such roads. The work of the State Highway Commission and its engineering department in planning, constructing and maintaining better highways, is a great achievement.

What, then, is the cause of the opposition to the Iowa State Highway Commission and the present highway program? I believe that a large part of it comes through the belief of taxpayers that the burden of taxation for highway purposes is not distributed in proportion to benefits. The commission is probably not responsible for the inequitable taxation, but through being the chief official body of the state in highway matters, it gets the blame.

### OURSELVES AS OTHERS SEE US

Many classes of citizens have been displeased by their experiences in highway matters, but one illustration will suffice:

Mr. Smith of Any Town, who drives his car mostly for pleasure, took his family and a friend out for an evening's ride. When he came to the newly-paved country highway, Mr. Smith settled back in his seat to enjoy the ride. He was not a fast driver but soon overtook the big car in front, which had stopped several times. A sign on its side read "Local Bus." He was turning off the path of the bus when a horn honked loudly from behind. Mr. Smith turned back again to the right and barely kept from running over a woman, who had alighted from the bus, by setting the brakes so tight that he slipped his tires and caused

Mrs. Smith to bump her nose on the back of the front seat and to mutter something about his learning how to drive a car. A huge blue and gold car sailed by, with its horn still bellowing. The driver, who was trimmed with brass buttons, gave Mrs. Smith such a look as the Kaiser might give a Frenchman. On the side of the big car was a beautiful sign which read "Limited Bus."

For another mile Mr. Smith followed the bus, which traveled as fast as he cared to go, aiming to pass when it stopped again. Three times it did this, but each time cars coming from ahead prevented his turning out, and Mr. Smith had to stop behind the bus. He watched the passengers drop coins in the fare box and felt that it was not just right for the stopping of the bus to bring money to its owners, while it brought to himself only expense for gasoline, brake linings and tires.

The incident just related is not a great exaggeration of what is actually happening every day throughout the state. The fact that the State Highway Commission has been active in promoting highway construction, and at the same time has been passive in the matter of equalizing the highway tax burden on the basis of benefits, has created so much dissatisfaction and opposition in our state that it may, if the condition is not changed, become a greater obstacle to carrying out the highway improvement program than any engineering or financial problem. It is the case where highway engineering needs also "human" engineering.

In 1922 twenty-two states regulated motor carriers in a greater or lesser degree. Iowa did not. Twenty-two states, not the same ones just referred to in every case, collected additional or extra taxes from motor carriers, in addition to the rates levied on private automobiles. Iowa got no extra money from them. The proposed bill formulated by the committee from the American Electric Railway Association, admirably meets the needs of the State of Iowa in the regulation and taxation of motor buses and motor trucks and merits the attention of all persons who are interested in the subject.

## Hudson County Bus Men Have Active Organization

ELEVEN lines traversing one of the most congested centers of population and one of the most highly developed bus transportation fields in the country form the Hudson County Bus Owners' Association, which has its headquarters in Jersey City, N. J.

This organization has shown considerable activity recently in legislative matters. After a series of meetings, a delegation headed by President Charles J. Gallagher and Counsel George L. Record appeared at the state Capitol in opposition to measures they considered detrimental to the bus interests.

Among such measures were Senate Bill No. 255, giving municipalities increased regulatory powers over buses, and No. 356, authorizing bus operations by street railways.

The following lines are identified with this body:

Hudson Boulevard, president, Cornelius Eaton; Hudson Boulevard South, president, William Kase; Hillside Bus Line, president, Chas. Dreyer; Palisade Bus Line, president, C. R. Wothke; Park Avenue Bus Line, president, Hugo Dock; Bayonne Bus Line, president, Frank Grecco; Union Hill Bus Line, president, James O'Keefe; Hoboken Jitney Association, president, Philip Martini; West Side & Montgomery, president, Alfred Pakenham; Greenville & Lafayette, president, Thos. Fleming; Bergen & Central Avenue, president, Robert Taylor.

## Motor and Accessory Body Elect Officers

THE Motor and Accessory Manufacturers Association announces the election of the following officers for 1923:

President, W. O. Rutherford, vice-president B. F. Goodrich Rubber Company; first vice-president, A. W. Copeland, president Detroit Gear & Machine Company; second vice-president, H. L. Horning, general manager Waukesha Motor Company; third vice-president, E. P. Hammond, president Gemmer Manufacturing Company; treasurer, L. M. Wainwright, president Diamond Chain & Manufacturing Company; assistant treasurer and secretary, G. Brewer Griffin, Westinghouse Electric & Manufacturing Company, Springfield, Mass.; general manager, M. L. Heminway; counsel, Sidney S. Meyers.

## Caution and Courtesy Urged by Bus Association

THE Camden (N. J.) Bus Association recently sent out a circular letter to all members urging greater caution. The letter read in part: "During the holiday season the number of bus riders and the amount of traffic increases. The drivers should watch every move they make. Constant courtesy will make an impression on the public, which will be reflected in next year's business." A ban was also placed on racing.

\*Abstract of paper given Jan. 24, 1923, before Iowa Engineering Society.

# News of the Road

From wherever the bus runs, we brought together the important events, here presented to show the movements of the day.



## Action Deferred on Los Angeles Franchise

Interests Represented by Mr. McAdoo Form New Company and Submit Amended Petition—Board Divided on Issue—Agitation for Referendum.

RECENTLY when interests represented by W. G. McAdoo applied to the Los Angeles Council for franchises to operate buses in that city an agitation for a general improvement in transportation developed throughout the entire city. Three applications are now pending before the Board of Public Utilities as announced in *BUS TRANSPORTATION* for March, 1923. The board is making an extensive study of the city transportation situation. However, the board during the period of its study has been divided on the franchise issue.

The McAdoo interests have formed a new company and filed an amended application for a blanket bus franchise covering the whole city. The new concern is known as the Peoples Motorbus Company, and its officers are: Marco W. Hellman, local banker, president; H. H. Cotton, treasurer; William G. McAdoo, Jr., a son of the former Secretary of Treasury, secretary, while William G. McAdoo, Sr., is the chief counsel and John Dickinson associate counsel. Col. Henry Laub has been appointed one of the division superintendents. The amended application was signed by Messrs. E. F. Simms and Joseph L. Rhinock, New York capitalists, and W. G. McAdoo, Sr., appearing as attorney.

### PETITION PROVIDES FOR FUTURE CITY OWNERSHIP

This petition provides that after five years the city may terminate the franchise by taking it under municipal ownership, after giving one year's notice. Universal transfers are provided with a fare not to exceed 10 cents for one continuous ride in the same general direction. Free transportation is to be given all city employees while on duty. The petition provides for the payment to the city of 3 per cent of the gross income.

A bond of \$100,000 is provided to insure that at least 100 buses will be in operation within eighteen months after the granting of a franchise. According to its president, the company states that it is ready to spend from \$2,000,000 to \$3,000,000 in equipment and terminals.

Whether or not the new company feels that it will meet defeat in its application, it is now conducting an active

campaign to place the matter in the hands of the voters at the next May election. Agents of the bus company are circulating initiative petitions to obtain the voters' consent to grant an operating permit as well as to repeal the 1916 ordinance which drove the jitney buses off of the streets.

## Independent Loses in Malden Controversy

Mayor Kimball of Malden, Mass., has refused to authorize bus operation in competition with the lines of the Boston Elevated Railway in Malden. The controversy between the railway and Joseph Hart, independent operator, over bus franchises was mentioned in the March, 1923, issue of *BUS TRANSPORTATION*.

The Mayor yielded after the railway threatened to withdraw all service from the Salem Street line if a permit was granted Mr. Hart. As a result of the Mayor's action, the Hart bus

## New York City Buses Invade Albany

Municipal Buses Make Difficult Journey Through Enormous Snow Drifts—Part of Mayor's Program to Promote Home Rule Policies.

BOTH in Albany and New York City transit matters have been much in the foreground during March and in all discussion of transit the bus has loomed up as an important factor.

On March 12 the bus came into the limelight, when four vehicles plumed with legends proclaiming Mayor Hylan's transit policies left the City Hall in New York on a unique pilgrimage to the state capital. The city administration working in conjunction with the Yorkville Chamber of Commerce, which desires additional bus service, evolved the plan of dispatching buses to Albany to appear at the hearing held on the Walker-Donahue bill (Mayor Hylan's pet measure) on



Mayor's "Paul Revere" buses about to leave New York City Hall for Albany

service has been withdrawn and the elevated will introduce bus feeder service at various points.

**Saginaw Votes Down Independent Bus System.**—At the special election held in Saginaw, Mich., on March 7, the grant of a ten-year bus franchise to the Saginaw Motor Omnibus Company was decisively defeated. The vote was 6,020 for and 8,601 against. This franchise was sought by John Wade of Atlantic City, N. J., associated with several New York City men and had the support of Mayor Mercer. On April 2, the joint railway-bus ordinance, which was defeated last November, will be submitted in an amended form.

March 11. The main idea was to demonstrate the ability of the bus to cope with the elements and to show the up-state legislators the type of buses used.

A Garford and a Reo, taken from service on the Eighty-ninth Street line, and two new Macks were chosen for the advance on Albany. A half dozen Yorkville citizens accompanied the buses. The Mayor and his party made the trip by train on the 14th. Three of the "Paul Revere" buses, as they were labeled, reached Albany on the early morning of the day set for the hearing after a strenuous trip. The snow drifts increased in size, the pilgrims found, as they journeyed northward and only by continuous running and much shovel-

ing did the caravan reach its destination on time.

The performance of the buses is remarkable as they were forced to break their way through roads over which no motor vehicle had passed for six weeks. The betting in the capital city was ten to one against their ever reaching Albany.

Upon the arrival of the buses, they were stationed along the streets leading to Capital Hill at strategic points, where their placarded messages received the attention if not the approval of up-state legislators.

At the hearing held on March 14 the Walker-Donahue bill giving New York City the right to operate her own transit lines was the only measure considered. At the head of 685 New Yorkers the Mayor led the fight for the measure. The principal points brought out by the defenders of the bill were early relief to the city in its traffic problems, an end to the long-standing deadlock over transportation and the right of municipal home rule. It is well known that the Mayor's transit plans include the operation of an extensive bus system.

The opposition speakers, mostly representatives of civic organizations, attacked the constitutionality of the measure, assailed the record of the city administration in bus operation, and pointed out the enormous cost the provisions of the bill entailed.

The outcome of this measure, as well as of the other similar Democratic bills, depends upon the action of the Republican Assembly. Recent developments would indicate that if these bills ever receive the Governor's signature, it will be in a considerably amended form in that the powers granted the city administration will be much less than originally proposed.

### Bus Petition Opposed by Illinois Steam Roads

The Ritter Motor Bus Company of Bloomington, Ill., is making a strong fight for existence in the face of keen opposition from Illinois steam railroads. The rehearing of the bus company's petition to operate between Bloomington, Pontiac, Colfax and Urbana was held in Bloomington on March 6 before a representative of the State Commerce Commission. Following the first hearing, the commission entered an order prohibiting the buses from operating.

At the rehearing, additional evidence was presented, tending to prove the financial responsibility of the company, the amount of business handled, the poor service afforded by the steam lines and the convenience of the buses by comparison. Citizens of the towns served explained how unsatisfactory was the service of the steam lines and how the buses, operating frequently and at hours which suited the convenience of the public, have grown to be a real necessity. The lawyers for the steam lines cross-examined each witness in the effort to prove that the buses operated irregularly and during

severe weather did not operate at all. It was admitted that on the dirt roads, when the mud became such that the buses could not operate, the service was discontinued. In a short time, it is promised, all these roads will have concrete surfacing, insuring all-year-round service.

The rehearing reviewed only the bus company's side of the case. The railroad attorneys asked for a continuance until April 3 when the evidence submitted by the Ritter company will be answered and arguments advanced to show that the bus service is not needed and that the steam line service is adequate. In the event that the Ritter company is again notified to suspend operation, it is expected that the company will test in the courts the right and authority of the commission to prevent bus operation upon the public highways. Such a service will be of prime importance to all of the bus operators in Illinois.

### Buffalo Traffic Situation Unsettled

**Mayor's Emergency Measure Sustained  
—Railway Acts Against Independents  
—Mayor Plans Motorization of Railway System.**

A recent decision of the New York State Court of Appeals sustains Mayor Frank X. Schwab and the City Council of Buffalo in their action to provide transportation facilities in Buffalo during the strike of platform employees which started on June 1, 1922. This decision dismisses the appeal taken by the International Railway in the matter of the application of the company for a writ of mandamus against the Mayor. The decision of the court sustains the findings of the Appellate Division, Fourth Department, which reversed the order of Supreme Court Justice Pooley, and approves the stand taken by Mayor Schwab that the court had no power to compel him to remove buses from Buffalo's streets.

The decision of the Court of Appeals establishes the right of the Mayor to issue permits to buses if a similar emergency should again arise. Justice Kruse upheld the Mayor's action only in so far as it was taken to provide emergency transportation while the railway lines were paralyzed by the strike.

The International Railway has started John Doe proceedings in the City Court to ascertain what connection, if any, there is between drivers and starters, who are stationed at starting points in the downtown business district.

The routes of jitney lines, it is alleged, are advertised by the starters, who are claimed by the railway to be in the pay of owners and drivers of jitneys to solicit passengers.

The International claims these operations illegal, inasmuch as no certificates have been obtained by the operators from the Public Service Commission. Arrests again are being made by spe-

cial agents of the International and city police.

Gradual replacement of trolley cars by buses by the International Railway has been proposed by the Mayor. The problem already has been discussed by the Mayor with Herbert G. Tulley, president of the International, and other railway officials. Mayor Schwab's plan is to have the company purchase two buses as each trolley car becomes worn out. It was declared that 800 buses would provide adequate service for the city. Rails and wires would be removed as the service gradually becomes motorized, which Mayor Schwab thinks would be within three years.

### New Bus Line Connects Leading Kentucky Cities

Louisville and Lexington are now connected by a bus line which began operation on March 28.

J. W. Barnes, Jr., and H. O. Barnes are proprietors of the Louisville-Lexington Bus Line, as the new line is known. Headquarters are at the Auto Bus waiting room in Lexington and at the Tyler Hotel in Louisville.

The route runs from Lexington through Versailles, Frankfort and Shelbyville to Louisville.

The new company will have a considerable amount of competition on local business, as the Louisville & Interurban Railroad parallels its route from Louisville to Shelbyville, while there is a gap of about 20 miles from Shelbyville to Frankfort, where the Kentucky Traction & Terminal Company operates through Versailles to Lexington, about 25 miles. The bus route is over the best pikes and through the highest part of the state. The route is through rich agricultural and stock raising districts, including the great thoroughbred horse breeding section of the Blue Grass country. Frankfort, the state capital, will produce a lot of business going both ways.

The Chesapeake & Ohio and Louisville & Nashville Railroads will form the greater portion of the through competition, as these two steam roads make several of the smaller towns on the route.

### Trackless Trolleys and Municipal Buses Proposed for Philadelphia

Philadelphia, Pa., has seen several new developments in transit matters within the last month.

An ordinance authorizing the operation of trackless trolleys on Oregon Avenue by the Philadelphia Rapid Transit Company was introduced in the Council on March 8. The proposed route is over Oregon Avenue from Eighteenth Street to Delaware Avenue, and the present fares, with free transfers to intersecting lines, would prevail. This operation would be carried on by a newly-formed subsidiary, the Pennsylvania Rapid Transit Company.

At the initial meeting of Mayor Moore's new transit advisory board, the motor bus question was brought

into prominence by a letter to the Mayor from the United Business Men's Association, suggesting that the city operate a system of 100 buses. This would place the city in direct competition with the rapid transit company.

Up to the present time no action has been taken by the Council on the applications of the Philadelphia Rapid Transit Company and the Keystone Transit Company for bus franchises. These applications were filed in December, 1922, and were reported in *BUS TRANSPORTATION* for December, 1922, and January, 1923.

The petition of the Philadelphia Rapid Transit Company was presented in the name of a subsidiary, the Philadelphia Rural Transit Company. A. E. Hutt is in charge of bus developments.

## Two New Lines Opened in Youngstown

The Youngstown Municipal Railway on March 18 opened two new bus lines to serve the southern residential section of Youngstown, Ohio. The route is auxiliary to the existing railway system and serve sections not now served by the railway lines. The company operates two other bus lines, one to the eastern part of the city and the other to the northern part (see page 125, *BUS TRANSPORTATION* for March, 1923).

The railway recently ordered eleven new buses, equipped with Bender bodies and White chassis. When this entire consignment is received, the company's bus equipment will total eighteen machines.

Receipts for the month of March by the company were \$18,472.75, an improvement over the same month of 1922, when the total was \$18,172.75. The total was reported to be a record for the company. The company's operating expenses for the month were \$18,472.75, leaving a net profit of \$18,472.75. The company's operating expenses for the month were \$18,472.75, leaving a net profit of \$18,472.75.

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## British Bus News Summarized

**Authorities Discuss Bus Stopping Points—Manufacturers Favor Heavy Duty on Motor Vehicles—Tramways and Bus Lines Consolidate**

THE question of bus stopping points in London has been considered by the Ministry of Transport and the police in conjunction with the London General Omnibus Company. The principal object of the new scheme, which is well advanced, is to fix permanent stopping points for the buses, and where buses and tramcars run alongside each other to fix separate stopping places with a view of avoiding the congestion which now occurs. Where there are no tramways, the bus stopping points are also being reconsidered in an endeavor to secure the best possible positions for them from a traffic point of view.

Stopping sign posts of a temporary nature have been in use for some time but these are giving place to signs of an improved type. These are in cream enamel with bronze moldings mounted on a tapering steel post. A further improvement is the provision of a frame beneath the sign in which certain current traffic particulars can be shown. On the reverse side of this frame are exhibited safety-first legends. The number of bus stop signs to be dealt with is 650 and they are being fixed at the rate of thirty a week. As a result of the erection of the temporary signs considerable speeding up of the traffic has been effected.

Two additional improvements which are designed still further to assist in the regulation of the traffic are the introduction of time-table boards and time clocks on outlying country routes. The time-table boards are exhibited all along the routes at all regular stopping points and have proved to be of great utility to passengers. The clocks have been introduced to assist the traffic staff in running the buses at even intervals. The conductors now "clock on" the buses on arrival at all important traffic points.

Quite a lively agitation has been started among manufacturers of heavy motor vehicles in England for the im-

position of an important duty on such machines coming from abroad. This could be carried out by bringing such vehicles under the safeguarding of industries act, which provides for a 33 1/3 per cent ad valorem duty on certain classes of goods. Pleasure cars are already subject to duties. The British manufacturers say that they cannot compete with countries which have depreciated currencies, and that they cannot compete with the United States because of the cheapness there made possible by production on an enormous scale. Those who advocate the new import duty say that the existence of the British heavy motor vehicle manufacturing industry is in the balance and that without help it cannot go on. Any attempt to impose the duty will doubtless be violently resisted by the great body of British free traders. The safeguarding of industries act, which aims at preventing "dumping" and at protecting certain "key" industries, was passed a year or two ago in the face of keen opposition by the government which had a great majority in the House of Commons, and it has been subject to repeated attack since. The present government has a comparatively small majority.

The tramways in Newcastle-on-Tyne are owned and worked by the Town Council, while those on the opposite side of the river belong to and are operated by the Gateshead & District Tramways Company. Recently the two systems were linked and through-running established by the construction of a tramway line on a bridge across the River Tyne. Collaboration has now been reached between the two tramways and two local bus lines so as to secure connections between tramcars and buses. The buses provide feeders and prolongations of the tramway routes for some 15 miles north and south of the Tyne.

The London bus drivers and conductors took another ballot in February

At the annual meeting of the Yorkshire (West Riding) Electric Tramway Company, the chairman stated that the position of the company had been improved by the number service which it had provided. The bus had not only protected the company from competition but had been a source of profit. There were now twenty-three motor vehicles in commission and ten more were on order.

D. Hays, general manager of the Scottish General Transport Company, in a speech at a social meeting of the staff, reviewed the progress of the company. In 1913 there was only one motor vehicle and now the company has 100 motor vehicles. Last year its motor vehicles carried nearly 7,000,000 passengers. He declared that the company wanted a new capital and said that it did not ask for a loan but provided that it was secured fairly and properly.

## New Bus System Welcomed in Aberdeen

The Aberdeen Motor Transit Company began the operation of buses on the streets of Aberdeen, S. D., on Feb. 26, the same day upon which the last of the abandoned Aberdeen Railway equipment was sold. The street railway discontinued operations on July 31 last. A proposal to have the city take over and operate the line was defeated at the polls last October. As the city has been virtually without transportation facilities since the discontinuance of the railway service the advent of the bus line was welcomed.

Three twenty passenger motor buses, equipped with White chassis and Brown bodies, constitute the company's rolling stock. A fifteen minute schedule is maintained over two routes, the West and North Side lines. The cash fare is 10 cents for adults with 5 cents for 75 cents and 5 cents for children. The company will be capitalized at \$50,000, and incorporated last December with the following officers: President, C. H. Herriot; vice-president, B. C. Lunn; secretary-treasurer and general manager, A. J. MacIntyre.

## New Indiana Laws May Affect Bus Rates

Although reports from main bus terminals in Indiana indicate that rates will be increased considerably because of the tax of 2 cents per gallon on gasoline imposed by the last General Assembly, the ten bus lines which operate from the Indianapolis terminal, the largest in the State, probably will not increase their rates. Owners of several of these bus companies say they are satisfied with the legislation affecting the motor transport business which was enacted during the Assembly. The main fight was to kill the bill which would have placed bus and motor freight lines under the jurisdiction of the Indiana Public Service Commission. This was accomplished.

The plan of the Motorurban Company, which operates buses from the Indianapolis terminal to Fort Benjamin Harrison, is to construct large oil tanks along its route for the storage of earload shipments of gasoline. The owners of the line assert they can save 6 cents a gallon by buying gasoline in large shipments and therefore will not have to increase their rates. Rates on lines running from Indianapolis average about 2 cents a mile. Forty-six buses leave the terminal each day for towns in a 70-mile radius.

The bus owners who are members of the Indianapolis Terminal Company supported the administration's bills in the Legislature for increased automobile license fees, a 2-cent gasoline tax and a special tax for buses according to their seating capacity. Under the license fee act, which was enacted during the final days of the session, bus owners will pay an annual tax of \$3 for each passenger capacity in each bus, in addition to increased license fees and the gasoline tax. Some independent owners, not members of the association, have announced that they will increase their rates when the gasoline tax becomes effective about June 1.

## Seven Lines Use Terre Haute Terminal

Terre Haute, Ind., is coming to the front as a center of motor bus operations. The majority of the lines entering the city operate from the union bus terminal, which is located in the business district. It is estimated that between twelve and fifteen hundred people use the terminal daily. The owners of lines using the station have formed the Terre Haute Motor Bus Terminal Association, with P. A. Wilkey as general manager.

The following lines belong to this association: Wabash Valley Transit Company, Charles A. Turner, president, operating to Greenup and Effingham; Ben Hur Bus Line, Frank Nosler, president, serving North Terre Haute, Jessup, Catlin, Rockville, Marshall and other points; New Goshen Line, Leo Minnock, proprietor; Linton-Terre Haute, Clay City, North Terre Haute and Burnett lines. An additional route to Sullivan will be opened soon.

## Tabular Presentation of Recent Bus Developments

Company	Address	Route
<b>Incorporations</b>		
Willamantic & Hartford Jitney Ass'n, Inc.	Hartford, Conn.	
Long Island Motor Bus Corp.	Lynbrook, N. Y.	
Lakeland Bus Co.	Lakeland, Fla.	
White Motor Bus & Truck Co.	Peoria, Ill.	
Greeley-Denver Transit Lines, Inc.	Greeley, Colo.	Greeley
Ellington Transit Corporation	Ellington, N. Y.	Jamestown to Ellington
<b>Applications Filed</b>		
Alfred Smith & Gordon Quimby, Gadhery Transportation Co.	Wilmington, Ill.	Dalton's Ranch to Susanville, Cal.
John Simon	Oak Park, Ill.	Joliet to Wilmington, Ill.
Northwestern Transit Co.		Pasadena to East San Gabriel, Cal.
C. C. Shinar		Oak Park and adjacent territory
Market Bus Co.	Paterson, N. J.	Happy Camp to Orleans, Cal.
C. S. Sirvain		Paterson to Maywood, N. J.
Gem City Motor Bus Co.	Quincy, Ill.	Sacramento to Jackson, Cal.
Egyptian Transportation Co.		Quincy to Clayton, Ill.
Librator Marchigiani		Marion to Carbondale, Ill.
F. M. Von Atzenger	West Hoboken, N. J.	Katonah to Pleasantville, N. Y.
Wabash Valley Transit Co.	Effingham, Ill.	Union Hill, N. J.
Emil Leindorf	31 E. 136th St., New York	Effingham to Marshall, Ill.
Lawrence Stage Co.		Grand Concourse, Bronx, N. Y.
Ultra Urban Bus Co.	Martins Ferry, Ohio	Chester to Drakesbad, Cal.
Andrew Castro	Castroville, Cal.	Martins Ferry to Washington, Va.
George E. Davis' Sons		Castroville to Monterey, Cal.
Earl Hoover		Cornwall, N. Y.
Donald MacPherson		Little Rock to Red Gates, Ark.
Salvatore Angelis		Arcata to Samoa, Cal.
Fred W. Hyserman	Rensselaer, N. Y.	Conshohocken to Bridgeport, Pa.
F. A. Warfield		Albany to Castleton, N. Y.
		Avila to San Luis Obispo, Cal.
<b>Permits Granted</b>		
Holbrook & Shuler	Elizabeth, N. J.	Huntingdon Park to Cudahy, Cal.
John Enright	Danville, Ill.	Elizabeth to Linden, N. J.
T. L. Clark Truck Co.		Danville to Georgetown, Ill.
Superior Motor Bus Co.		Bellevue to Mascoutah, Ill.
John McAlevy	Paterson, N. J.	Hawthorne, N. J.
Philip Neece		Colterville to Kinsley, Cal.
John Keyser	Paterson, N. J.	Paterson to Newton, N. J.
United Stages, Inc.		Niland to Braxley, Cal.
Ellington Transit Corp.	Ellington, N. Y.	Jamestown to Ellington, N. Y.
Charles Bouehard		Litchfield to Standish, Cal.
Arrow Motor Line		Chicago to Libertyville, Ill.
W. M. Wood & C. Briscoe	Newark, Del.	Elkton, Md., to Wilmington, Del.
Samuel Garrigue	Camden, N. J.	Camden to Turnerville, N. J.
S. S. & Dan Summers		Burney to Cayton, Cal.
J. H. Cottrell	Springfield, O.	San Diego to Teacata, Cal.
Zanesville & Dayton Transp. Co.		Columbus to Grove City, Ohio
Ivy Way Bus Line, Inc.		Bureau to Chillicothe, Ill.
L. S. Cullison		Columbus to Mount Vernon, Ohio
J. L. Dotson		Milford to Newhouse, Utah
Yosemite National Park Co.		El Portal to Tahoe, Cal.
George Long		Brieberg to Mariposa, Cal.
Eastern Massachusetts Street Ry.	Boston, Mass.	Susanville to Wendell, Cal.
Bus Transportation Co.	Wheeling, W. Va.	(Blanket Franchise)
Casper Bus & Transfer Co.	Casper, Wyo.	Wheeling
Intercity Bus Transportation Co.	North Bergen, N. J.	Cheyenne
		Jersey City to Kearney, N. J.
<b>Applications Denied</b>		
Eric County Bus Line		Erie, Pa., to Conneaut, Ohio
Cadillac Bus Co.		Erie, Pa., to Conneaut, Ohio
George S. Jones Co.		Petaluma to Napa, Cal.
Pickwick Stages, N. D.	Los Angeles, Cal.	Los Angeles to Coleville, Cal.
<b>Lines Started</b>		
H. D. Snyder		Ashland to Mount Vernon, Ohio
Shore Transit Line		Salisbury to Claiborne, Md.
Kasey Vineyard	Malden, Mo.	Malden to Kennett, Mo.
Caddo Transfer & Warehouse Co.	Shreveport, La.	Mansfield to Pelican, La.
C. L. Richards		Greenville to Conneaut Lake, Pa.
S. R. Sundstrom	Janesville, Wis.	Madison to Janesville, Wis.
Ernest S. Cook	Indianapolis, Ind.	Greensburg to Indianapolis, Ind.
Hudson, Maynard & Clinton Bus Co.	Woburn, Mass.	Hudson to Clinton, Mass.
Servier Co.		Twin Falls to Poestello, Idaho
Fred Ballard		Faribault to Mankato, Minn.
Nash Bus Line	Moline, Ill.	Moline to Clinton, Ill.
William Miller		Hannilton to Cincinnati, Ohio
White Star Bus Transit Co.		Columbus to Springfield via London, Ohio
Motor Transit Co.	Aberdeen, S. D.	Aberdeen
Sioux Falls Transportation Co.	Sioux Falls, S. D.	Sioux Falls to Yankton, S. D.
Northwestern Transp. Co.	Sioux Falls, S. D.	Sioux Falls, S. D., to Alton, Iowa
East Berlin Transportation Co.	East Berlin, Pa.	Hannover to East Berlin, Pa.
H. A. Davidson	East Ely, Nev.	East Ely to Ely, Nev.
<b>Proposed Lines</b>		
Cannon Ball Transportation Co.	Portsmouth, Ohio	Portsmouth to Ironton, Ohio
Thomas A. Jones		Utica to Clayville, N. Y.
Christensen & Ridings	Waterville, N. Y.	Waterville to New Hartford, N. Y.
Newark Bus Corp.	Newark, N. J.	Morristown to Newark, N. J.
W. H. Brown & George McConnell		Laramie, Wyo.
R. E. Angst	St. Joseph, Mo.	St. Joseph to Cameron, Mo.
Albert F. Warner	Watertown, N. Y.	Watertown to Syracuse, N. Y.
Hatfield Transfer Co.	Trenton, Mo.	Trenton to Chillicothe, Mo.
J. R. Seanton	Hannond, N. Y.	Ogdensburg to Gouverneur, N. Y.
J. H. Willoughby	Lorain, Ohio	Dunkirk, N. Y.
A. L. Kelly	Zanesville, Ohio	Zanesville to Columbus, Ohio
Gandy Bridge Co.		Tampa to Gandy Bridge, Fla.
Dixon Ferry Co.	Dixon, Ky.	Dixon, Ky., to Evansville, Ind.
C. B. Ellin	Trenton, N. J.	Morrisville to Trenton, N. J.



## United Stages Seeks Authority for New Route

A second hearing was held on Feb. 20 and 21 on the plea of the United Stages Company requesting the California Railroad Commission to grant it a certificate to operate passenger and express service connecting Los Angeles, Venice and intermediate points, territory which is now served by the lines of the Pacific Electric Railway.

At the opening of the rehearing of the case the Stages Company presented its case through its general manager and attorney. The railway offered its opposition to the bus lines' applications through its chief counsel.

The United Stages Company since the year 1912 has been operating stage lines in southern California, handling baggage, express and passengers. Its operations, schedules and fares, however, have been controlled by the Railroad Commission only since 1917.

The Stages Company's proposed new route between Los Angeles and Venice originates in the heart of the business district of Los Angeles, and from this terminal the line proposes to operate via Eighth Street, Western Avenue, Washington Boulevard to Culver City, thence along Motor Avenue in Culver City, thence along Venice Boulevard from Culver City, paralleling the electric railway's interurban line to the proposed terminal in Venice.

The proposal of the bus concern points out that the entire distance of the proposed line will be over asphalt paved boulevards and that no local passenger business will be handled within the city limits of Los Angeles; however, pickups of passengers will be made locally within Los Angeles for passengers destined to either Culver City, Venice or points along the proposed bus line. It is proposed to establish a running time of forty-five minutes each way between Los Angeles and Venice; the one-way distance is 15.4 miles.

The bus company proposes to operate twenty-passenger buses on a thirty-minute schedule between the hours of 6:30 a.m. and 7 p.m., and after 7 p.m. hourly.

Officials stated the company would require six buses to start service, and would borrow this equipment from its other lines until the special type of bus for the new line could be obtained. Three months would be required to obtain the equipment, it was said.

## Referendum Sought on Santa Monica Franchise

Factions opposed to the franchise recently granted the Bay Cities Transit Company to operate buses in the Bay district of Santa Monica, Calif., have drawn up petitions to institute referendum proceedings against the operation of this system. The grant of this franchise was announced in the March, 1923, issue of BUS TRANSPORTATION.

The real purpose of the referendum campaign is to give the people an opportunity to express their will on the question of transportation in Santa Monica.

On March 10 the Bay Cities Transit Company, which operates the present bus system in the city, applied to the State Railroad Commission for authority to negotiate a loan of \$25,000 for the purpose of purchasing new equipment. The company was obliged to file a \$10,000 bond to guarantee its compliance with the terms of the franchise ordinance within ninety days from the date of its adoption.

## State Commission Sanctions Use of Bus by Railway

Eastern Massachusetts Authorized by Commission to Operate in Seventy-two Cities Provided It Secures Local Consents.

ONE of the most sweeping orders ever issued in Massachusetts has been promulgated by the Department of Public Utilities. It authorizes the Eastern Massachusetts Street Railway to acquire, own and operate motor vehicles for the transportation of passengers in seventy-one cities and towns.

This order covers practically the whole territory which this company serves, but it should be explained that the company must also obtain a license from the city or town in which it is to operate. The company does not now intend to run motor buses in all these places, but desires to supplement its trolley service with motor vehicle service, feeding into the latter, wherever it can be done to advantage without competing with some other railway.

### STATEMENT EXPLAINING ORDER

In connection with its order of approval the Department of Public Utilities makes the following explanation:

The approval of this department is merely the first step, and that after such approval is obtained the company is subject to the provisions of Secs. 45 to 49 of Chapter 159, which provides, among other things, that motor vehicles for the carriage of passengers for hire cannot be operated in the manner of a railway without first obtaining a license therefor from the licensing authority of the city or town in which it is desired to operate.

We have no doubt that it is in general for the public interest and convenience that the Eastern Massachusetts Street Railway should be permitted to own and acquire motor vehicles for the transportation of passengers, and to operate them in any city or town where it is not operating street cars and where the local licensing authorities may deem it advisable to issue a license for such operation. The only limitation that we feel should be placed upon this general permission is in respect to certain areas in some cities or towns in which some other street railway is now operating over its own locations.

It is possible that in such a community the Eastern Massachusetts Street Railway might be given by the local authorities a license to operate motor vehicles upon highways or portions of highways upon which it now has no location, and where it might cause undesirable competition with another electric railway. This would be in effect to grant to the Eastern Massachusetts Street Railway a location upon a highway in competition with another railway. As a grant of location to a railway by a city or town is subject to the certification of this department that it is consistent with the public interest before the same is

Line	From	To	Stops
1	City	City	City
2	City	City	City
3	City	City	City
4	City	City	City
5	City	City	City
6	City	City	City
7	City	City	City
8	City	City	City
9	City	City	City
10	City	City	City
11	City	City	City
12	City	City	City
13	City	City	City
14	City	City	City
15	City	City	City
16	City	City	City
17	City	City	City
18	City	City	City
19	City	City	City
20	City	City	City

Railway Donates Buses for Crippled Children.—Baltimore Traction Company, a subsidiary of the United Railways, Baltimore, Md., on March 12 turned over to the City Department of Education two buses to be used in transporting crippled school children.

Akron Municipal Bus System Proposed.—Councilman Rose recently introduced in the Akron, Ohio, Common Council a resolution calling upon the city to investigate the cost of installing and operating a municipal bus system. The resolution was referred to the utilities committee.

New Idaho Route Opened. A new route between Twin Falls and Pocatello, Idaho, has been established by the Scrivner Company, and negotiations are practically closed for the purchase of another line now in operation between American Falls and Pocatello. Tentative plans have also been formed for the erection of a motor bus depot at Twin Falls.

Johnstown Railway to Open Third Bus Line.—The Traction Bus Company, a subsidiary of the Johnstown Traction Company, has made application to the Pennsylvania Public Service Commission to operate buses from the railway's offices to the Johnstown city line in the Twelfth Ward. The company now operates four buses on two feeder lines, which traverse the Dale district and Lorain borough.

Capital Bus Line Extended.—The Public Utilities Commission of the District of Columbia has authorized the Capital Traction Company to operate buses from the end of the car line at Fourteenth and Kennedy Streets, west on Kennedy Street to Sixteenth Street and north on Sixteenth Street to Alaska Avenue. This is an amendment to an order previously issued, by which the railway would have operated buses only to Sixteenth and Montague Streets.

Suit Started to Restrain Montebello Municipal Line. The city of Montebello, Calif., made the defendant in a complaint recently filed with the State Railroad Commission by Henry F. Colman of Los Angeles, in which Mr. Colman charges that the municipality is operating a bus line in violation of the law requiring a certificate of convenience and necessity from the Railroad Commission. Mr. Colman asks the commission to compel the municipality to cease operating the bus line until it has complied with the law. The claim is made that because of the city's activity as a common carrier the legally authorized carriers in the district have suffered great loss.



## Financial Section

### California Commission Releases Motor Vehicle Figures for 1922

In the 1922 report of the California State Railroad Commission is shown for the first time a classification account for motor stages and trucks known as Class A; that is companies showing a gross revenue of \$20,000 or more for the year ending Dec. 31, 1921.

#### Abstract of Balance Sheet of Class A

Automotive utilities operating in California.

ASSETS	
Value of equipment .....	\$4,930,722
Value of shop equipment .....	221,515
Value of materials and supplies ..	415,708
Value of lands owned .....	451,231
Cash .....	266,411
Accounts receivable .....	592,718
Stock debt discount .....	77,954
Other assets .....	2,082,578
Deficit .....	516,256
<b>Total assets .....</b>	<b>\$9,555,091</b>
LIABILITIES	
Stock outstanding (incorporated) ..	\$3,052,519
Cash invested (unincorporated) ..	2,143,681
Notes outstanding .....	923,851
Balance due on automotive contracts ..	354,181
Other accounts payable .....	1,196,953
Reserve for accrued depreciation ..	1,069,821
Interest accrued but not due .....	8,697
Other liabilities .....	599,493
Surplus .....	205,994
<b>Total liabilities .....</b>	<b>\$9,555,091</b>

#### Abstract of Revenue and Expense Accounts

Automotive utilities operating in California.

REVENUES	
Passenger .....	\$6,918,944
Freight .....	2,386,977
Mail .....	191,417
Express .....	649,468
Miscellaneous .....	2,079,408
<b>Total revenues .....</b>	<b>\$12,226,214</b>
EXPENSES	
Labor .....	\$2,822,038
Gasoline and oil .....	1,250,986
Repair and replacements .....	2,055,772
Salaries—officials .....	417,091
Office and clerical expenses .....	613,355
Insurance, licenses, taxes .....	451,752
Rent .....	325,207
Stationery and printing .....	119,902
Depreciation .....	1,978,614
Interest .....	83,408
Miscellaneous .....	2,819,244
<b>Total expenses .....</b>	<b>\$12,037,372</b>
<b>Net revenues .....</b>	<b>\$188,842</b>
<b>Number of passengers carried .....</b>	<b>11,128,539</b>
<b>Average fare per passenger .....</b>	<b>6.25</b>
<b>Number of tons of freight carried ..</b>	<b>185,597</b>
<b>Number of cars .....</b>	<b>1,156</b>
<b>Number of trailers .....</b>	<b>59</b>

### Receiver Named for Albany Company

At a special term of the United States Court at Syracuse, N. Y., on March 17 Judge John R. Hazel named Milton Van Keuren, president of the Hudson Valley Distributing Company, as receiver for the Woodlawn Improvement Association Transportation Corporation, Inc., operating in Albany and vicinity.

Petition for a receiver was filed by William Birney and John G. Shea, representing 80 per cent of the claims against the company and a majority of the creditors. The corporation resumed bus operation on March 19 and is now giving service over all of its routes.

### Oregon Line Issues Annual Report

Figures compiled by the Linnton Transit Company show that during 1922 more than 200,000 persons were carried by its three Mack buses on the Portland-Linnton (Ore.) line. According to the report which covers the first full year of the company's operation, the average number of passengers carried by the three buses each day was well over 700.

The business during the last six months showed a gain of 38,000 passengers over the first half of the year.

Figures on operating costs are also given in the accompanying tabulation, which was compiled by W. E. Young, secretary and treasurer of the company.

Bus No. 1, purchased Jan. 1, 1922, traveled during the year 45,776 miles. Its operating expense was:

		Per Mile
Gas .....	\$1,552 75	\$0.0339
Oil .....	69 71	.0015
Tires .....	441.00	.0096
Repairs .....	232 90	.005
<b>Total .....</b>	<b>\$2,296 37</b>	<b>0.050</b>

Bus No. 2, purchased Jan. 1, 1922, traveled 55,903 miles and its cost of operation was:

		Per Mile
Gas .....	\$1,864 57	0.033
Oil .....	83 55	.0014
Tires .....	441.00	.0078
Repairs .....	240 00	.00429
<b>Total .....</b>	<b>\$2,629 12</b>	<b>0.047</b>

Bus No. 3, purchased July 4, 1922, traveled 34,584 miles, with following operating expenses:

		Per Mile
Gas .....	1,214 47	0.0351
Oil .....	14 69	.0003
Tires .....	255.00	.0073
Repairs .....	47.78	.0013
<b>Total .....</b>	<b>\$1,531 94</b>	<b>0.044</b>

**Hudson-Philmont Line Sold.**—The Hudson-Philmont (N. Y.) line has been sold by George and Louis Kranz to Paul Hirschmann of Hudson.

**Minnesota Line Changes Hands.**—The Mesaba Transportation Company has purchased the White Bus Line operating between Duluth and Virginia, Minn.

**Kentucky Company Buys Line.**—The Columbia-Campbellsville, Ky., bus line has been purchased from Tartar Brothers by the Service Transfer Company.

**Dillingham Company Stock Issue Authorized.**—The Dillingham Transportation Company, operating a number of stage lines in southern California, has been authorized by the State Railroad

Commission to issue 956 shares of its capital stock of a par value of \$95,600 and to assume the payment of indebtedness aggregating \$46,851.

**Pickwick Stages Proposes Additional Stock Issue.**—Pickwick Stages, Inc., has applied to the California State Railroad Commission for authority to issue \$44,800, par value, of its capital stock, being the unissued balance of \$100,000 of common stock of the company.

**Ohio Company Plans \$50,000 Stock Issue.**—The Akron-Youngstown Bus Company has filed with the Ohio Utilities Commission an application for authority to issue \$50,000 of 8 per cent preferred stock for the purpose of purchasing three new buses, refunding short-time obligations, amounting to \$20,753, and purchasing garage equipment and insurance.

**Illinois Company Dissolved.**—The Jacksonville-Springfield Transportation Company, organized last fall to operate a bus line between the two Illinois cities, has dissolved and surrendered its charter to the Secretary of State. William McNamara, Jacksonville, was president and W. J. Houston, the same city, secretary-treasurer. Too much competition, it is said, made it advisable to drop the project.

**Some Colorado School Bus Operating Costs.**—According to statistics compiled by the superintendent of schools of Weld County, Colorado, the Grover motor buses, carrying children to and from school, traversed 4,040 miles during December, 1922. The average mileage per gallon of gasoline was 9.1; the average cost to operate the buses was 22.7 cents per mile; the salary of the driver varied from \$20 a month to \$60 a month.

**Authority Sought for Motor Transit Stock Issue.**—The Motor Transit Company, Los Angeles, Calif., has applied to the State Railroad Commission for authority to issue \$657,753 of its capital stock and to issue shares of the par value of \$110,000, to be sold at not less than 90 per cent of par, for the purposes of capitalizing investment not heretofore represented by any issued stock, and to cover cost of proposed expenditures for additions and improvements to its equipment.

**Employees to Share in Profits of Cincinnati Company.**—The Cincinnati (Ohio) Motor Bus Company has announced a profit-sharing plan whereby efficient employees will receive a bonus of 25 per cent of the net earnings of the company for 1923. According to James J. Fitzpatrick, attorney for the company, this step was taken for the purpose of promoting closer co-operation and harmony. A grievance committee, consisting of employees of the company, has been appointed to consider all matters of complaints among employees. This committee also has power to recommend the discharge of any employee for good cause. The employees will meet semi-monthly with the officers to discuss new ideas looking toward the welfare of the company.

# Bus Regulation



## Important Decision in New York

Judge Rules Lines Operating Prior to Enactment of Local Consent Law Must Be Sanctioned by Local Authorities—Appeal Entered by Owner of Troy-Grafton Line.

A DECISION recently rendered by Justice Rosch in the New York Supreme Court is of particular interest to bus line owners in New York State who were operating prior to 1914, when the transportation laws were amended so that local consent was required. The court held that a bus line in existence prior to 1914 must comply with the law requiring local consents, notwithstanding the fact that the owner possesses a certificate of convenience and necessity from the Public Service Commission.

The case in question involved the operation of buses between Troy and Grafton, with John Burdick as the plaintiff and Nelson P. Tilley as defendant. An injunction restraining operation of Mr. Tilley's line was granted. An appeal to the Appellate Division of the Supreme Court has been taken but this appeal has not as yet been argued.

### HISTORY OF THE CASE

The history of the case follows: In 1912 Burdick and Snyder established a bus line between Troy and Grafton under the name of the Troy Auto Bus Company. They later dissolved partnership, and in 1921 Burdick was granted a certificate of convenience and necessity by the commission to operate between Troy and Grafton. At that time the transportation corporations law contained the provision that the city must consent to such operations. Mr. Burdick secured authority from the City of Troy in accordance with this act. In 1914, the Lamphere Bus Line obtained a certificate from the commission and after desultory operations in 1922 was assigned to the defendant, Mr. Tilley. The assignment was approved by the Public Service Commission after a hearing, at which Mr. Burdick appeared in opposition.

Application was then made to the Supreme Court for an injunction restraining operation by Mr. Tilley on the grounds, first, that the commission, under the law as it existed at the time the original certificate was issued to the Lamphere Bus Line, had no jurisdiction over the streets of cities of the second class, and, second, that the later amendment to the law requiring the consent of the local authorities was a police regulation and applied to certificates already issued as well as those to be issued; that the grant from the Public Service Commission was a mere license subject to revocation or control by legislative enactment and not a vested property right, and, therefore,

before the Tilley bus line could lawfully operate its owner must obtain the consent of the authorities of the city and towns through which it passes.

## Washington Court Renders Decision on Interstate Operations

The Supreme Court of the State of Washington in two recent decisions upheld the constitutionality of the law passed in 1921, requiring that parties operating automobiles over the state highway for the transportation of persons and property for private gain be required to obtain certificates of convenience and necessity from the State Department of Public Works.

The most important of the two actions, calling for the fullest opinion from the court, was that brought by the Northern Pacific Company and other railroads operating between Seattle and Portland, to enjoin A. M. Schoenfeldt, operating the Interstate Motor Transit Company, from operating stages between Seattle and Portland. He had been operating for some time without having a certificate of necessity.

The court held that because transportation from one point within the state to another outside the state is in character an interstate operation, it does not follow that the state cannot regulate such business, and that the act is a valid police regulation and binding upon all who use the highways for private gain.

The other case was a test case instituted at the behest of the Department of Public Works to confirm the constitutionality of the same law.

### News from the Legislatures

The legislative session of 1923 is drawing to a close with comparatively few of the measures discussed in previous issues of BUS TRANSPORTATION becoming laws. The state legislatures have already adjourned in Alabama, Arizona, Arkansas, Idaho, Indiana, Montana, North Carolina, Oregon, South Carolina, South Dakota, Texas, Utah, Washington and Wyoming.

The Indiana Legislature passed a bill providing for an annual tax on buses based on seating capacity. Three dollars per person is the stipulated fee. All vehicles carrying passengers or commodities must also pay registration fees according to capacity in tons. These fees range from \$10 for one-half ton capacity to \$250 for 7½ tons. A law was also enacted in Indiana, levying a license fee of 2 cents a gallon on gasoline, to be collected on the retail basis. The Moorhead bill, which would place all bus lines under the regulation of the Public Service Commission, was killed in the House. This measure was strenuously opposed by bus, truck and automobile associations.

In the New Jersey Legislature, the Barkman bill, which would allow railway companies to operate buses, was defeated.

Montana House Bill No. 191, pro-

viding for the regulation of motor vehicles, was passed by the House. The bill provides for a license fee of \$10 for a year, and a gallon of gasoline for each passenger. The bill also provides for a license fee of \$10 for a year, and a gallon of gasoline for each passenger.

The Missouri Legislature passed a bill providing for the regulation of motor vehicles. The bill provides for a license fee of \$10 for a year, and a gallon of gasoline for each passenger. The bill also provides for a license fee of \$10 for a year, and a gallon of gasoline for each passenger.

In the State of Washington, a motorist, after June 1, 1923, will be permitted to drive at a maximum speed of 35 miles an hour on a main road. The rate of speed permitted for motor trucks will also be increased, based on the size of the truck. The measure will support the transportation of the state.

At the present time, the great majority of the proposed legislation mentioned in the March, 1923, issue, is reposing in committee.

## Touring Car Buses Ruled Out of Newburgh

The discontinuance of operating touring cars between Newburgh, N. Y., and outlying points under franchises that call for motor buses or stages has been ordered by a resolution passed by the Newburgh City Council at a meeting held on Feb. 19. The enforcement of the requirements of the ordinance is left with the City Manager, Major W. Johnston McKay, who was voted full power to regulate the bus situation.

Major McKay outlined his views on the matter to a BUS TRANSPORTATION representative as follows:

"It is not my intention to work any hardship on any bus operator. Our city needs all of them it can get, but I do not mean to allow a few men to operate ramshackle touring cars as buses in competition with operators who have from \$50,000 to \$50,000 invested in modern buses. You realize that the man with the touring cars, by carrying passengers for slightly less than the operators of large buses can raise havoc with the summer riding and still make a good profit."

**License Fees Reduced.**—The Town Council of West Hoboken, N. J., has reduced the bus license fee from \$100 to \$25. The higher fee was placed in effect a year ago.

**California Sightseeing Lines Do Not Require Certificates.**—The application of Charles G. Newman for a certificate of public convenience and necessity to operate sightseeing bus service from Long Beach to various points in southern California has been dismissed by the State Railroad Commission. The commission held that this class of service does not come under the provisions of the law of 1917, requiring a certificate for the operation of automobile passenger vehicles.

# Personal Notes



## Chicago Claims Mr. Moser

Herbert C. Moser, for Ten Years with Fifth Avenue Organization, Now in Charge of Transportation for Chicago Company—Joined Industry in Its Infancy and Aided Materially in Its Development

LOST in admiration of a well-balanced, seemingly perfectly organized institution, it is but natural to forget that its efficiency is but a symbol of long years of planning and labor on the part of men, unheralded and unsung, who have built stone upon stone the structure so admired. Such an institution is the Fifth Avenue bus and such a man is Herbert C. Moser, for nine years in charge of its transportation department, who on March 10 became assistant general manager for the Chicago Motor Coach Company.

It is no exaggeration to say that many of the methods that have made the Fifth Avenue system both popular and famous had their origin in the brain of Herbert Moser. When he joined the organization the bus industry was an infant, and a puny one at that. As for the Fifth Avenue Company, it was a mere shadow of its present self. It took prophetic vision, indeed, in 1913 to foresee the possibilities of automotive transportation, but that was just what Mr. Moser had. Only a man of daring leaves an established field for an untried one. That was what Mr. Moser did, impelled by his faith in the future of the motor bus. The passing of the years has justified his choice.

Herbert Moser is a New Yorker born and bred. All of his forty years have been spent in the greater city. When a boy of fifteen, he took his place in the ranks of the workers of the world, and since that day he has never let up working. His first job was with the Standard Oil Company as an office boy.

### TWENTY YEARS WITH RAILWAY

From the employ of the Standard Oil Company he went to the Metropolitan Street Railway, where he remained for twenty years. His first job with the railway was to sort and count transfers. His early days in the transportation field may be defined as "days that were filled with labor and nights devoid of ease," for most of his jobs in those days demanded time be seized. Mr. Moser did make the most of his "spare time" by attending night school at the Y.M.C.A., and taking a correspondence course.

It is difficult for those who know Mr. Moser today as a well-built athletic man, with a hand clasp like the grip of a steel vise, to realize that the present man is the outgrowth of the stripling of only a few years ago who weighed 98 lb. It is characteristic of the man that

in a few years, by continual training in physical culture, Mr. Moser practically built himself over physically.

In the railway business, he was successively register inspector, chief clerk, traveling auditor and secretary to the superintendent of transportation. In



H. C. Moser

going from department to department, he gained a broad view of the transportation business, which stood him in good stead in his later career.

When the New York State Public Service Commission was established in 1907, Mr. Moser got his first real big opportunity. The commission asked the Metropolitan Street Railway for statements and reports regarding operating expenses and other similar data. It was discovered that the company kept no such records. A statistical bureau was then created and Mr. Moser placed in charge. It was not long before the railway had complete data on operating costs, and the statistical department became a real factor in the company's business. Mr. Moser made a specialty of time-tables, and in his efforts to perfect the schedules of the railway he made an exhaustive study of traffic conditions in the larger Eastern cities.

Meanwhile a change was taking place in the transportation world. The bus entered the field. Herbert Moser was one of the few railway men of these days who did not regard the newcomer with scorn. He visualized at once the possibilities of the use of buses in urban transportation, and was probably the first street railway man to enter the bus industry.

Since 1906 the Fifth Avenue Coach

Company had been operating buses in New York with varying success. On Feb. 1, 1913, Mr. Moser joined that organization as head of the transportation department, a position he held until his recent resignation. At the time Mr. Moser joined the company it had 125 buses in operation and the daily revenues never exceeded \$4,000. Today the system operates 270 buses and a big day's receipts will amount to \$25,000.

The office of superintendent of transportation tried but did not exhaust Mr. Moser's capacity for work. That Mr. Moser made good no one will gainsay. He has done more than that. He has planted a new idea in the transportation world as applied to the handling of traffic. Herb Moser was the man behind the famous civility crusade of the Fifth Avenue Coach Company. All his life he has preached the gospel of courtesy, and he succeeded in permeating the entire organization with that spirit.

Mr. Moser introduced the human element in all of the relations of his company both with its employees and the public. He early learned the secret of handling men. To him his men were never cogs in a big machine; they were human beings and he treated them as such. He took away the numbers from the badges worn by conductors and inserted their names instead. This innovation has proved very successful, as it promoted better feeling among the men and better relations with the public.

When Mr. Moser came to the Fifth Avenue Company he found a feeling of discontent among the men because of the uncertainty of the hours. This he dispelled by establishing regular runs and hours for all employees. Mr. Moser changed the rates of pay from platform time to a minimum of five hours. A man working over five hours received pay for eight hours, over eight hours actual time up to ten hours; for over ten hours time and one-half. The practice of hiring extra men for the summer months was discontinued under Mr. Moser's management. He allowed men to volunteer for the extra night runs during the summer and let the natural depletion of his forces during the fall take care of the decreases for the winter.

### STARTS DRIVERS' SCHOOL

A school for instructing new drivers was instituted and the merit system introduced. Safety campaigns and committees were appointed and accidents reduced thereby to a minimum. Standardized uniforms for the men and standard equipment for the buses, tailor and barber shops, lunch rooms, a pool and billiard parlor were established as part of the Moser plan of promoting good will and efficiency among the men in the organization.

Mr. Moser organized get-together meetings for the employees at which he encouraged public speaking among the supervisory force. In short, at all times he endeavored to create common bonds of interests and loyalty among his men. About his last official act was to foster a plan for using service emblems for the employees to wear in their lapels.

These badges are in bronze, silver and gold in proportion to the length of service.

Mr. Moser introduced many new methods of operation. He successfully developed the method of queue loading, organized the snow fighting forces of his company and instituted express and limited service during rush hours. He established an efficient set of schedules and time-tables. Incidentally for ten years he endeavored to induce the city to pile the snow on the sides of the street and finally, in 1923, saw his plan actually put into practice.

In Chicago, where he joins John A. Ritchie and George A. Green, his former associates, Mr. Moser will have an opportunity to apply his progressive ideas to a newly organized and rapidly growing concern. One does not need to be a seer or a prophet to venture the prediction that history will repeat itself and that Herbert Moser will be as important a factor in the building of the Chicago organization as he was in the development of America's pioneer bus system.

### Mr. Sparks Goes to Chicago

On April 1 Ralph M. Sparks became vice-president of the Yellow Coach Manufacturing Company, Chicago, Ill., in charge of the public utility division of that company. For thirteen years Mr. Sparks has been identified with transportation and brings to his new post a broad knowledge of the industry in its many phases.

Mr. Sparks, a native of Muncie, Ind., received his education in the local high school and at Purdue University. In 1910 he went with the Bay State Street Railway as a special assistant to President Sullivan. During his nine years with the railway he filled many positions, being successively general passenger agent, assistant to the general manager, assistant to the first vice-president and transportation manager in charge of operations.

In 1919 Mr. Sparks, foreseeing the development of trackless transportation, started his activities in the automotive field by organizing a company for the distribution of Willys-Knight cars in Worcester County, Mass., including the city of Worcester. Two years later Mr. Sparks was the prime mover in the organization of the public utility division of the Republic Motor Truck Company, at Alma, Mich. In this position, he developed and introduced the Republic-Knight motored bus. Fifty-two of these buses were installed in eight cities, namely, Baltimore, Boston, Providence, New Haven, Newark, Youngstown, San Diego and Detroit.

Herbert B. Flowers has resigned as vice-president and general manager of the United Railways & Electric Company, which controls the Baltimore Transit Company, operator of buses on Charles Street, Baltimore, Md. Mr. Flowers becomes president of the New Orleans Public Service, Inc.

### E. V. Hull Operates Network of Maryland Lines

E. V. Hull of Smithsburg, Md., has done as much to develop the section in which he lives as any other one man. His accomplishment has been in the way of transportation for the people of Western Maryland.

Starting in 1916, with one sixteen-passenger bus, he now has a fleet of twenty-one "White Line" buses. These go out of Smithsburg and Hagerstown to outlying districts, some of the routes extending a distance of 75 miles. They pass through a beautiful country, and have been the means of developing a section hitherto not reached by any transportation medium. The number of miles covered each day is approximately 1,150, and it is safe to say that 500 passengers are handled daily.



E. V. Hull

Efficiency and persistency are the paramount features of his success, and wherever he has operated a line, these have been made the cardinal principles. In his efforts to be of service to the general public, Mr. Hull has won the commendation of the Public Service Commission, which has favored him in the granting of permits as he now holds fifteen of them.

The commissioners claim that Mr. Hull has developed one of the greatest transportation lines in the state of Maryland. Mr. Hull believes that his success in operating his various lines is due in a large measure to the co-operation of E. Austin Baughman, road commissioner of motor vehicles, in keeping all public highways open for traffic during all kinds of weather, especially during the winter.

In 1916, he started his first bus line between Smithsburg and Hagerstown, a distance of 9 miles, with one sixteen-passenger car. This was operated three months and proved to be a paying proposition, whereupon a second bus was purchased and put in operation.

From this small beginning Mr. Hull has built up, virtually single handed, a system embracing seven interurban lines and covering a large part of western Maryland. The development

of the Hull system has not come all at once. Gradually lines were added, new equipment purchased and service extended wherever there was a need for bus transportation. Several new projects are under consideration and will doubtless become realities in the near future.

Mr. Hull now employs twenty-eight people and maintains an up-to-date repair and maintenance shop. Notwithstanding the extent of his operations, there is no detail that escapes his vigilant eye. He inspects the buses personally, keeps in close touch with all his employees and knows the route from A to Z. He meets upon courteous treatment of passengers and takes the attitude that he is a seller of transportation, not merely a bus operator. Upon this firm foundation, E. V. Hull has built up a business that is steadily growing in popularity as well as in size and scope.

### G. K. Pollock, Founder of the Richmond Bus System

Twenty years' experience in dealing with every possible phase of the transportation problem of a municipality of 170,000 as chairman of the Council committee on streets fitted Gilbert K. Pollock, Richmond, to become operating head of the first bus company successfully operated on a large scale in Virginia. Mr. Pollock is an attorney by profession and in close touch with public sentiment and conditions in his city. It was this insight into public opinion which led him to see the possibility of forming and successfully operating the Richmond Rapid Transit Corporation.

The company was organized and began operations on Feb. 1 last and patronage on its lines has increased every day since the first bus left its terminal. On March 1 the company began operating its second line, with an open invitation to the public to petition the Council for additional service in other districts.

"I saw the trend and need of the city," Mr. Pollock said in explaining how the idea of forming a bus line first entered his head. "Richmond has a large fan-shaped area in the West End where the people have rebuffed every effort to install street car tracks. Overhead wires for trollebuses were also opposed, so I saw a chance to perform a service to this section, and at the same time establish a paying proposition by instituting bus service."

Through Mr. Pollock's efforts the bus line was financed and placed in operation. His idea was to keep abreast of the time through the new method of transportation, and in this he received the co-operation of some of Richmond's leading financiers, who are numbered among the stockholders of the company. Oliver J. Sands, president of the American National Bank, is treasurer of the Richmond Rapid Transit Corporation.

Mr. Pollock is a life-long resident of Richmond and has always taken an active interest in the affairs of the city.



# Business Information

What is being bought and built. Latest news from the factories and the field.



Market conditions affecting the bus industry. Price changes in important commodities.

## Tire Notes from Akron

**Ten per Cent Price Advance Announced by Some of the Companies — Remainder Expected to Follow Suit—General Expansion in the Industry.**

THE attitude of many of the leaders in the tire industry was correctly reflected in BUS TRANSPORTATION for March, 1923, which described the reluctance with which the Akron makers approached the subject of price advances. Even at this writing the entire industry has not as yet advanced prices and many are taking advantage of the situation to obtain business on the lower basis. It is not unlikely, however, that all will move prices forward within the next few weeks. Several companies announced 10 per cent advances during March. Because of the smallness of the price increase there is still talk of another advance, but this must be discounted as was the constant rumor that prices were to go up during the first two and one-half months of the year.

During the month many of the larger companies which sell exclusively to dealers either completed or started new expansion programs. The General Tire & Rubber Company, one of the largest producers of bus tires in the Akron district and which specializes on this type of equipment, moved into its new addition, which doubles the production capacity of the company. Output now is in the neighborhood of 4,000 tires a day as compared with half this number previously produced.

The Miller Rubber Company, which is making efforts to get away from the automobile makers' original equipment business and is also making strenuous efforts to obtain bus business, has announced a new \$325,000 addition to its plant. While this addition will not be built specifically for tire production, its completion will relieve present congestion in the tire department. During the month the Lambert Tire & Rubber Company of Barberton moved into its new addition, which doubles the production of the company for the second time in fourteen months. L. J. Schott, formerly president of the Amazon Rubber Company, completed, during March, the formation of the Northern Rubber Company. This company has taken over the Biltwell Rubber Company plant at Barberton and will start production of tires in the near future.

The new small diameter tires which have been especially designed for buses have received their first commercial impetus. The Firestone Tire & Rubber Company, one of the companies making this new tire, announced that a large

Chicago motor transit company has applied a large number of these tires. At the same time some of the other companies announced that additional bus manufacturers are showing an interest in the new tires. As described previously in BUS TRANSPORTATION the new tire brings the body of the vehicle closer to the ground and reduces body swaying and overturning hazards.

## Gasoline Prices—March 26, 1923

City	Cents Tank Wagon	Per Gal. Service Station
Albany, N. Y.	24 5	26 5
Atlanta, Ga.	23	25
Boston, Mass.	23 5	26
Chicago, Ill.	20	22
Cincinnati, O.	21	23
Detroit, Mich.	21 4	23 4
Fort Worth, Tex.	18	21
Indianapolis, Ind.	20 8	22 8
Jacksonville, Fla.	19	21
Kansas City, Mo.	15 5	17 5
Louisville, Ky.	22	24
Memphis, Tenn.	19	21
Milwaukee, Wis.	20 6	23 6
Mobile, Ala.	22	24
Newark, N. J.	23	25
New Haven, Conn.	24 5	27
New Orleans, La.	20 5	21 5
New York, N. Y.	24 5	26 5
Oklahoma City, Okla.	20	23
Omaha, Neb.	20 25	22 25
Philadelphia, Pa.	23	26
Pittsburgh, Pa.	23	26
Richmond, Va.	23	25
St. Louis, Mo.	20 5	22 5
St. Paul, Minn.	20 7	22 7
Salt Lake City, Utah	25 5	27 5
San Francisco, Calif.	17	20
Seattle, Wash.	19	22
Spokane, Wash.	22 5	25 5
Washington, D. C.	23	25

## Rolling Stock

Frank Kroboth, Greene, N. Y., has placed a Fageol bus in service.

Pacific Northwest Traction Company, Everett, Wash., has installed two Fageol buses of the limousine type.

Garner & Beloff, 708 North Waco Street, Wichita, Kan., are in the market for a new motor bus.

William R. Collins, proprietor the Milbrook-Poughkeepsie (N. Y.) line, has purchased a Fageol bus.

Jefferson Highway Transportation Company, Minneapolis, Minn., has added two Fageol limousine type coaches to its fleet.

Dudley Bishard, Fort Scott, Kan., expects to purchase a large heavy-duty bus in the near future.

Albert E. Warner, Watertown, N. Y., is in the market for additional equipment for a new 72-mile Syracuse-Watertown route.

Puget Sound International Railway & Power Company, Everett, Wash., has received two street car type Fageol buses.

Mesaba (Minn.) Transportation Company announces the purchase of a Fageol safety coach.

Red Ball Transportation Company, operating between Charles City and Mason City, Iowa, recently purchased a seventeen-passenger Packard bus.

Northwestern Transportation Company, Sioux Falls, S. D., has put two new seven-passenger Cadillacs into service over its Sioux Falls-Alton route.

Transit-General Electric Line, Bridgeport, Conn., has installed a sixteen-passenger Bridgeport bus and also purchased two Maccar buses.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has pur-

chased three Packard cars for bus service between New Castle and Ellwood City.

John J. Flournoy, 401 Minnesota Street, Wichita, Kan., is planning to put a new bus in the place of one recently damaged in an accident.

E. J. Dorey, White Bus Service, Binghamton, N. Y., has purchased from Cook & Towner, local distributors, a Brockway E-2 chassis with a McKay body.

The Homefolks Company, W. D. Weaver, manager, 33 Cusacks Building, New Orleans, La., is considering the purchase of both single and double deck buses.

Royal Blue Route, Butler, Pa., has ordered a thirty-passenger White bus for the Butler-Parkers Landing line, which will commence operations April 1.

Long Hill Bus Line, Bridgeport, Conn., has installed a new sixteen-passenger Reo bus. C. H. Randall is proprietor of this line.

Speder Bus Lines, operating between Newburgh and Cornwall, N. Y., has purchased two Brockway omnibuses, of twenty-five passenger capacity.

Bingaman Motor Express Company, Reading, Pa., recently bought a twenty-two passenger Fageol bus for the Reading-Pottstown route.

Richmond Rapid Transit Corporation, Richmond, Va., has installed sixteen buses equipped with White chassis and Bender bodies and ten with Reo chassis and Fitz-John-Erwin bodies.

Missouri-Kansas-Texas Railway has purchased from the General Motor Truck Company's Dallas branch a GMC model K-20 bus for service between Waco and Bellmead, Tex.

P. G. Atkins, 197 Main Street, Greenwich, N. Y., expects to increase his equipment by the purchase of two additional buses. Mr. Atkins operates six routes in the Greenwich-Cambridge section.

Wisconsin Motor Bus Lines, Milwaukee, Wis., has purchased four type "J" buses of the Fifth Avenue Coach Company, New York, N. Y. The Milwaukee company is a subsidiary of the Milwaukee Electric Railway & Light Company.

## Business Notes

Central Motor Sales Company, Dayton, Ohio, has been appointed distributor for the General Motors Truck Company in that territory.

J. Rowland Bibbins, engineer, will engage in private consulting practice in transportation, development, with offices at 921 Fifteenth Street, Washington, D. C. Mr. Bibbins was formerly manager of the Department of Transportation, United States Chamber of Commerce.

Morand Cushion Wheel Company, Chicago, Ill., is now in production on a new 34 x 33-in. wheel of the vulcanized type. This new wheel is suitable for light duty buses and for trucks of the speed wagon type, in the 3 to 1-ton classification.

The Six Wheel Truck Company, Fox Lake, Wis., and the Wisconsin Truck Company, Madison, Wis., have merged their interests. The product of this merger is to be re-named the "Super-Traction" truck, production on which is to be concentrated in Madison.

Oncida Motor Truck Company has closed a contract with the Russell Company, Kenosha, Wis., for the building of gas-propelled railroad coaches. The Oncida works has started production on six trains for the Russell company which have already been sold to several Eastern steam railroad lines. The engines for these coaches are six cylinder, 70-hp, Wisconsin.

Arthur H. Lacey, formerly assistant director of engineering for the Hall-Scott Motor Car Company and recently engaged in the practice of consulting engineering in Oakland, Calif., is now in charge of engineering and production on the new Doble steam car to be produced by Doble Steam Motors, San Francisco. Mr. Lacey will be available for consultation on automotive matters at 714 Harrison Street, Oakland.

Commerce Motor Truck Company, Detroit, Mich., announces that it has taken over the exclusive manufacture and sale of Commerce trucks, having leased the plant of the Commerce Motor Car Company, which retires as a manufacturing organization and is being liquidated. The new company also takes over the entire dealer and distributor organization which was formerly operated under the direction of the Commerce Motor Car Company.





# BUS TRANSPORTATION



New York, May, 1923

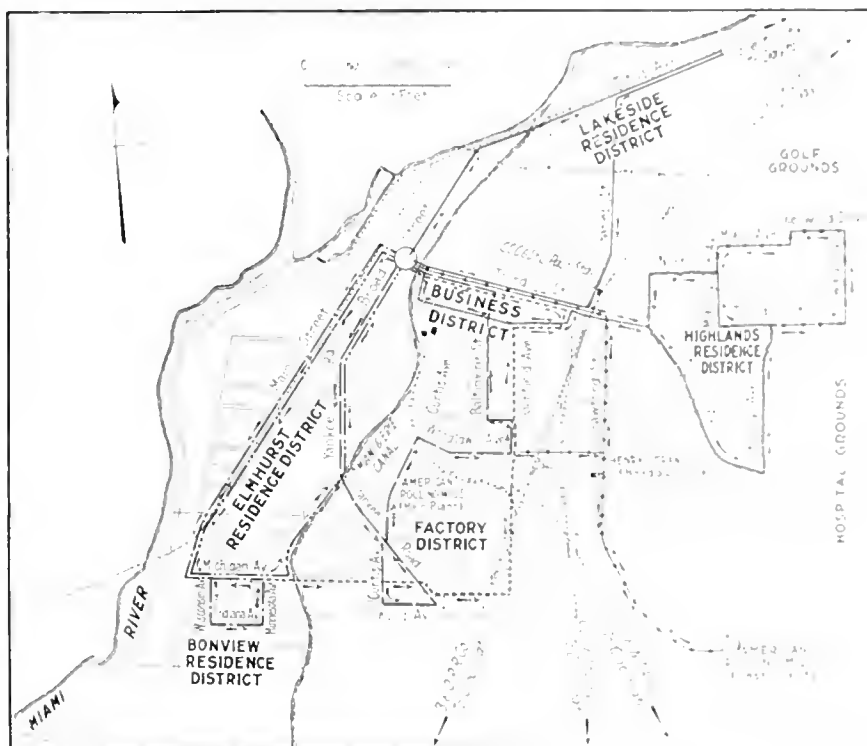
## The Motor Bus Handles All Urban Traffic in Middletown, Ohio

Henry's Transportation Company Operates Fourteen Buses Over Six Routes—The Fare Is a Nickel on Any Route, the Average Length of Which Is a Mile and a Half—It Takes Two Fares, 10 Cents, to Go Across the City—The Traffic Handled Amounts to Approximately 4,000 Passengers per Week Day, with 3,000 on Sunday

THE city of Middletown, Ohio, is one of the few cities of its size in this country that have no local electric street railway system. The only electric line passing through the city is that of the Cincinnati & Dayton Traction Company, and this system does not handle local traffic. At one time a horse-car line existed along one of the main streets of the city operating between the two railroad stations. But this has long since passed out and the tracks have been removed. As a matter of fact, what really happened was that the bus and the private automobile, coupled with well-paved streets, developed with the city and made an extension of rail service unnecessary.

Motor buses now furnish the sole means of regular scheduled transportation in this city of 24,000 population. The entire system of bus lines, except one two-bus line from the business district to an outskirt community, is owned and operated by Henry's Transportation Company, a local concern, of which Henry Johnson is president and general manager. Four years ago, so Mr. Johnson told a representative of BUS TRANSPORTATION, he bought out a concern which was operating a few buses, and since that time has built up a system of lines which he believes adequately cares for the traffic of the city.

Mr. Johnson has built up his business by somewhat rough and ready methods, rather than by any attempt scientifically to analyze the traffic requirements and then meet them. He is a keen observer and has plenty



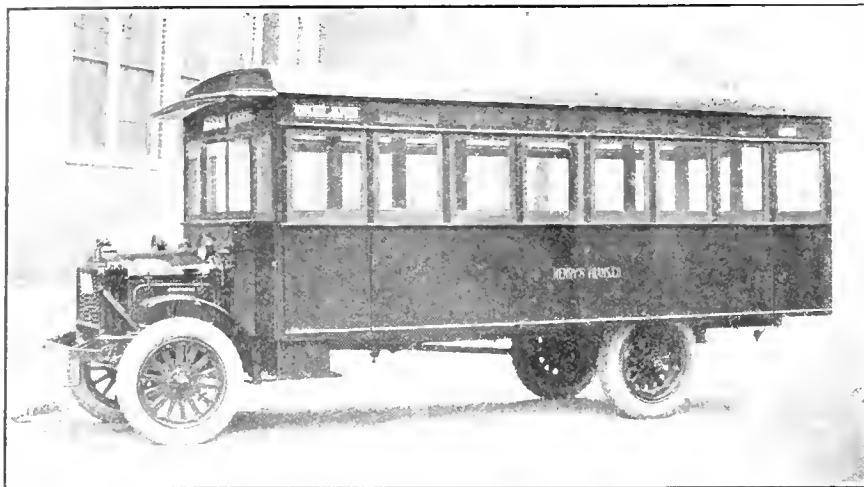
The map of Middletown shows the bus routes operated by the Henry Johnson Transportation Company. All routes start and terminate at Third and Broad Streets.

of good horse sense, which has enabled him oftentimes to make as good an analysis of traffic requirements by his own reasoning as is sometimes made by more scientific methods.

The largest industry in Middletown is the American Rolling Mills, a producer of steel and iron products. There are numerous other smaller plants and several large tobacco concerns and paper mills. The city

might be termed an industrial town with a large proportion of homeowners, and is spread out over considerable territory, as the map indicates. The rolling mills are in two units about a mile apart, and the entire plant when operating at capacity employs about 6,000 people.

Henry's Transportation Company has six bus routes in the city and operates a fleet of fourteen buses to cover these routes. Two additional



*This is the standard type of bus adopted. It is a twenty-six-passenger body on a Model N United States chassis*

lines are to be established as soon as two new buses now on order are received. The new lines will be extensions of existing ones and were made necessary by the growth of outlying residential districts. The present and prospective routes are shown on the map. Each of the existing lines is symbolized. Crossed and dotted lines show proposed extensions. It will be noted that all lines are loop routes, and all radiate from the traffic center of the city at Third and Broad Streets. The average length of a line is 1.5 miles each way, or 3 miles out and back. Two of the lines, the Crawford and Michigan routes, serve the American Rolling Mills, and one of the proposed lines will add a link to this service.

During the rush hours, both morning and afternoon, the Woodlawn Avenue route is extended to the East Plant of the American Rolling Mills, and instead of reaching Third Street via Garfield Avenue the buses are

routed via Crawford Street. They thus pass closer to two of the steam railroad stations. With the receipt of additional buses it is proposed to extend the line that now terminates at the Bonview residential district to Garfield Avenue, and thus give additional service to the factory district of the city.

The buses are operated on a fifteen-minute schedule on all routes, and run from 5:15 a.m. to 12:30 a.m. except Sunday. Fares are collected as passengers enter the bus, a fare box being placed beside the driver's seat. Three different makes of fare boxes are now used, as Mr. Johnson has so far been unable to standardize on any one. No transfers are issued, as Mr. Johnson figures that the additional expense of carrying transfer passengers could not be met on a 5-cent fare and he wishes to adhere to that rate. This means that the 5-cent rate is from or to the center of the city, a crosstown ride costing 10 cents.



*The "hay burner" once ran up and down Third Street between the three railroad stations*

Traffic demands are closely watched by Mr. Johnson, and he frequently checks up on numbers of passengers carried on each route at various times of the day, special attention being paid to the accommodation of peak loads which occur from 6 to 7:30 in the morning and from 4:30 to 6 in the evening. From 5:15 to 8:30 a.m. and from 3 to 6 p.m. all of the buses are in service, operating on the various routes, on seven and one-half-minute headway or on fifteen-minute headway. During the remainder of the day only part of the buses are in service on fifteen- and thirty-minute headways, respectively.

In laying out runs a nine-hour work day for drivers is used as the basis with a twelve-hour spread. The first set of drivers come on at 5 a.m. and work till 12 o'clock noon. They are relieved by the second shift, who work from 12 to 3 p.m. The first crew then work from 3 p.m. to 6 p.m. and the second from 6 p.m.

The Henry Johnson Transportation Co.						
Middletown, Ohio, 192						
Driver	Bus No.	Route				
Register Opening	Register Closing	Time	Start	Stop		
Trip	Passengers	Oil	Gas	Repairs	Remarks	

*The form of day card used by the drivers not only shows the traffic handled but the oil and gasoline consumption and cost of repairs*

till closing time at midnight. The men are required to turn in trip sheets like the sample shown in the accompanying illustration. In handling crews Mr. Johnson believes the best service is obtained by being constantly on the job with the men and not trusting to blind luck and to the average initiative of the drivers. It is by putting his own time and attention to the work that he keeps things going as well as he does.

The expansion and development of the city is also watched and new routes or additions to old ones are added to keep pace with this growth of new residential sections. New buses are put on only when it is certain that they will be in constant use, as Mr. Johnson does not believe in having idle equipment on hand.

Of the fourteen buses now in operation, eight are Reos and the balance are United States Motors. The two new ones soon to be put in serv-

ice are also United States Motors, which is the type on which Mr. Johnson has now standardized. All have twenty-six-passenger bodies, and are equipped with pneumatic tires all around. He reports only one broken spring in two years' operation of these vehicles. He believes that economy of operation, mobility and comfort are all strong features of these buses.

A striking feature of the Middletown buses is their neat appearance as compared with others of their class, and it is evident that they receive careful and continuous maintenance. The question at once arises as to how this can be accomplished at the low rate of fare charged. The answer is that Mr. Johnson has combined his bus maintenance with a general garage and agency business and thus has reduced some overhead charges and can keep his maintenance men always busy on commercial work if not on bus work. Furthermore, since entering into the automobile agency and repair business, he can purchase all of his supplies and renewals at wholesale prices.

Mr. Johnson has just completed a fireproof brick and concrete garage and salesroom, and here he maintains an agency for Studebaker cars. He also operates a retail accessory store and a gasoline filling station and conducts a general automobile repair business. Six skilled mechanics are employed, three on a day shift and three at night. Mr. Johnson buys tires in large quantities at factory prices and keeps a stock on hand. Of course, there is small outside demand for the large tires used on the buses, but by handling a complete line of tires of all sizes he can purchase at wholesale, and effect a considerable saving. In the same way gasoline, oil, lights, and small repair parts are bought in quantity, and the amount of working capital tied up in supplies is small because he can turn over his stock rapidly through his retail sales business.

Henry's Transportation Company does not make any analyses of costs, either of transportation or maintenance. In other words, the business as a gross—in expense and revenue—is the only record kept, except that each operator's daily receipts are separately accounted for. But no records of cost per bus-mile or per passenger-mile, cost of upkeep of each bus, etc., are kept by the company. This makes actual analyses of



*Headquarters at Henry's Transportation Company, Middletown, Ohio, showing the garage and service facilities of the company.*

operations and of profit a bit difficult if not impossible.

The records kept do show—as judged by cash turned in by drivers—about 4,000 passengers carried each week day and about 3,000 each Sunday. The only check on this figure is to watch the drivers.

Mr. Johnson's method of keeping out opposition is simple. By anticipating the traffic demand and meeting it, by maintaining a low rate of fare, and by keeping his equipment in first-class condition and maintaining schedules, he keeps his customers satisfied. There is really no occasion for any opposition in Middletown. Probably the most important bar to opposition is the 5-cent fare.

It is notable that handling local traffic by motor buses has not been generally successful in the towns of southwestern Ohio, and it is only in Middletown and Cincinnati that this means of transportation has assumed any commensurate stability. Of course, the absence of a local electric railway line in Middletown is quite a factor. However, the absence of electric lines makes the appeal to prospective bus operators the stronger, and it is undoubtedly due to Mr. Johnson's vigilance and up-to-date methods that he is able to keep the local business to himself.

No franchises have been granted to bus operators in Middletown, though the City Commission has had the matter before it several times. Bus and taxi owners are required to pay an annual license fee of \$10 for the first vehicle, and \$5 for each additional one operated by them. Special parking space has been set aside for the use of the buses at the corner

of Third and Broad Streets, the space is sufficient to accommodate four cars.

## Highway Financing by State Funds Growing

**T**WENTY-THREE states finance their highway programs entirely through a state fund established by each. Twenty-two states each have a state fund which is augmented by contributions from counties, while three cling to the county unit system. The following are the states which finance their 7 per cent system entirely with state funds: Alabama, Colorado, Connecticut, Florida, Georgia, Illinois, Indiana, Kentucky, Maine, Maryland, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Rhode Island, Virginia, Washington, Wisconsin and Wyoming.

The states in which the state fund is aided by direct contributions from counties or land benefit districts are: Arkansas, Arizona, California, Delaware, Idaho, Iowa, Louisiana, Massachusetts, Michigan, Mississippi, Montana, Missouri, Nebraska, Ohio, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Vermont, and West Virginia.

The three states which still are entirely dependent upon the counties are: Kansas, North Dakota and South Dakota. The state basis was adopted in Texas, Utah, Oklahoma and Montana this year.

This information was prepared by American Association of State Highway Officials, Washington, D. C.

# The Bus and Standardization

Early Action Predicted by Automotive Authority—Engineers, Operators and Insurance Men Should Work Together to Get Real Progress in Distinctive Branch of Industry

BY C. F. CLARKSON

General Manager Society of Automotive Engineers, New York

THE modern bus is, it seems to me, clear evidence of the coming of a new epoch in transportation. It embodies very effectively recent developments of automotive engineering with respect to smoothness and increased power output of engines, and to comfort in riding over various grades of road under different climatic conditions.

It is appreciated generally that standardization will prove just as useful in the development and production of a large number of buses as it has proved in the case of the now very widely used automobile. Many of the standards that have been established are, of course, applicable in the bus field. There should be, at the earliest possible date, standardization of features peculiar to bus production and operation, in the rational manner followed generally by the Society of Automotive Engineers for many years, the crystallization and probable permanency of design features having been developed.

The procedure in the adoption of S.A.E. standards is based on sound, safe principles. There is no forcing of any kind in the formulation of standards in either the initiatory or the intermediary steps. The society is committed to the policy of evolution as opposed to any ideal classification or scheme; that is, no subject is considered for standardization except in answer to a normal spontaneous demand, and all suggestions are always closely scanned before a subject is listed for consideration.

"Service," long discussed in many quarters, is yet a largely unsolved problem. Basically, nothing is as necessary to motor vehicle maintenance as systematic service conducted at costs fair to all concerned. The satisfactory solution of this problem can be greatly hastened by more complete standardization. The greater the use of motor vehicle apparatus, the greater the need for standardization.

As to what has been done to date, it has been estimated that the saving effected by the use of S.A.E. standards in the automotive industry amounts to 15 per cent of the total

annual retail value of automotive products. Without S.A.E. standardization the sales prices of new and used cars could never have been as low as they were. Standardization is not stagnation but the substance of quantity manufacture development. It has never impeded worthwhile improvements in automotive design. In fact, it rarely involves design at all.

All sound work must be based upon proper test over a sufficiently long period. S.A.E. standardization may be defined as the acceptance and practice of carefully correlated engineering specifications of materials, dimensioning and methods other than those of a proprietary or commercially protected nature. In order to formulate successful standards it is necessary to have co-operative action and mutual concession between all interests.

A problem well stated is half solved. For this reason, it is advisable that due consideration be given to what standardization is now needed in the bus field as such. At the present time the society has not any formal committee giving attention to the formulation of bus standards, for the reason that no definite decision has been made as to what steps should be taken in this connection. Various members of the truck division of the S.A.E. standards committee are of course qualified to take part in such work, and naturally some phases of the matter have been discussed informally.

There has been some demand for the formulation of regulations from the insurance underwriters' point of view with respect to such features of bus design as exist, braking equipment and safe tilting angles. In such work, it is the policy of the society to proceed in a co-operative way with representatives of other organizations, giving advice on engineering elements involved. The society takes up, through its own committees alone, only those matters which are practically entirely of an engineering nature. For example, the National Automobile Chamber of Commerce, through its committees, has handled

such subjects as body weight allowances, inasmuch as the problems involved are mostly of a commercial nature affecting the vehicle builder's guarantee.

It is appreciated, of course, that bus development will proceed largely along a distinctive line, probably drawing further and further away from truck construction. The society will doubtless have a special committee on the subject before long. Some of the engineers feel that numerous mistakes would be avoided and the possibility of standardization in connection with buses advanced materially by holding early conferences of representatives of those companies and organizations which have had valuable experience in this field.

There is some sentiment to the effect that unless the business is guided properly, practices will develop which will handicap progress, and that the inherent problems in the bus field are more difficult than those connected with motor trucks. According to this view, the formal study of salient regulatory and standardized features of motor bus operation cannot be begun too soon. There should, of course, be no attempt to standardize the practice of engineers as designers or the exercise of engineering ability. The things which should be standardized are those which might just as well be standard as any other way and have a real bearing on economical and safe operation of the vehicles.

It is easy to foresee that, as the number of buses and the makes of these increase, if a proper amount of standardization is not had, the complications for both the bus builder and operator are going to be unduly great.

Talent is measured by its achievements. The automotive engineer can be depended upon to do his part in rational standardization procedure with regard to buses.

## Jersey Operators Pooling System

ALL of the bus owners on the Palisade Avenue and crosstown routes in West New York, N. J., with one exception have returned to the pooling system. Twenty-three signed up at a recent meeting and perfected details of organization.

Each of the twenty-three buses in the pool will be distinguished as in the pooling system for regular headway, which means greater guarantee

of safety to the traveling public, by a card inside and another outside.

Under the plans formulated there will be twenty cars in operation all day from the West Shore ferry terminal. The morning rush-hour period will end at 9 o'clock. The Palisade Avenue line will be operated until 3 o'clock in the morning and the crosstown run until 1 a.m.

These hours may be subject to change after a reasonable tryout. The meeting of the twenty-three own-

ers was pledged to give proper service to the public as the first essential to success and upbuilding of the business. A small number of owners caused the discontinuance of the pooling system a couple of months ago.

Under the terms of the agreement no limitation is placed on the hours an owner may run his bus. The basis of revenue from the business done will be upon the number of runs made and in this way no check is placed upon enterprise.

## Inside and Outside Advertising Sells Jersey Service

UP-TO-DATE equipment, backed by frequent and well arranged service, are the main methods by which the Hillside Bus Association induces people to use its service. Outside the buses sell themselves and inside advertising cards are used. This association consists of forty-three individual owners, who operate in a pooling organization that gives each one substantially the same

amount of work to do and the same return.

The 8-mile route followed starts in West New York, and connects with the Lackawanna Railroad ferry at Fourteenth Street, Hoboken. A great many Hillside passengers take the Hoboken jitneys, or touring cars; these run sixteen blocks beyond the Fourteenth Street terminal to the Lackawanna Station of the Hudson

Tubes, which give service to uptown and downtown New York.

The fare for a one-way trip is 10 cents, with only a 5 cent charge from the Hill section in Hoboken to West New York. Headways vary from two minutes during rush hours, night and morning, to six and seven minutes during other parts of the day. The first buses start from each end at 5:45 o'clock in the morning and the last trip starts at 12:30 a.m., the running time being about forty minutes. A seven-day a week service is supplied. The schedule provides for thirty-seven buses a day, allowing six buses off for repairs.

Practically all the buses are of the standard type shown in the illustration, painted in brown with a belt rail of light cream. While the general type is standardized, this does not apply either to the make of body or chassis. Chassis include Bridgeport, White, Mack, Day-Elder, Master, Service, and others, and bodies are made by Burstein, Belmont, Metropolitan of Bridgeport, etc. The bodies carry twenty to twenty-six seated passengers, or about forty with standees. Most of the bodies have two longitudinal seats, as shown in the illustration, although a few have four cross seats, that is, two pairs on each side of the center aisle.

Since the buses pay 5 per cent of their gross income as a tax to the city, fare boxes, Johnson make, are installed to record the fares collected. Each bus carries about 750 passengers a day.

As mentioned above, the operators on this line are combined in a voluntary association, with a paid secretary and an office in West New York, also four starters, working in two shifts, one at each end of the route during the working day. The present officers of the association, serving for the first six months of this year, are Charles Dreyer, president, and the following members of the board of directors, Henry Hoppock, Rudolph Kaiser, George Lapore, John Lowiskey, Robert McIntyre. The secretary and treasurer is William Pressbrey.

Advertising cards are handled by the Schindler Advertising Company, Newark, which is helping the operators to sell transportation by special cards carried in the racks. The one now in the buses is headed "Items of Interest to Bus Passengers" and quotes, from an article in the August, 1922, issue of BUS TRANSPORTATION, the number of routes and mileage of the Jersey bus systems.



*Bridgeport bus with Metropolitan body operated on Hillside Line*



*Front and rear view of Hillside (N. J.) bus*

## Some Details of the Paris Six-Wheel Buses

**A Trial Vehicle Has Proved Successful and  
Fifty More Will Be Added—Seating Capac-  
ity Provided for Forty-eight Passengers**

THE Société T.C.R.P.\* has in operation on the Madeleine-Bastille line a six-wheel omnibus which presents a number of novel features. A preliminary account of this vehicle was given in the issue of BUS TRANSPORTATION for August, 1922, page 418. Additional details were contained in a recent issue of *Le Génie Civil*, from which source the following information was obtained.

Experience with the sample bus has been so satisfactory that fifty more are now under construction. The first series of the large buses will be used on the above-mentioned route, on account of its straightness, these long buses being best adapted to a route practically straight, although they can be turned with facility due to the fact that steering is done by both the front and the rear axles.

### DEAD WEIGHT 330 LB. PER SEAT

The six-wheel bus weighs, empty, about 16,150 lb., and it has a seating capacity for forty-eight passengers. The dead weight per passenger is therefore little more than 330 lb.

The total wheelbase is 21 ft. 4 in., the over-all length 34 ft. 4 in., the over-all width 7 ft. 5 in., and the wheel diameter 37.4 in. Other im-

portant dimensions are given in the accompanying illustrations.

The engine used on the new omnibus is the same type as that employed on the two-axle buses of the same company, only that the latter is lighter. The engine has four separate cylinders,  $4\frac{1}{2}$  in. bore and slightly under 6 in. stroke. The

nated by A in the figure, connects the rear and middle springs, oscillating about a shaft carried on a support attached to the chassis. The intermediate and rear axles are thus able to accommodate themselves to irregularities in the road, minimizing the vertical displacement of the rear part of the bus, reducing shocks, etc.

Two main brakes and one auxiliary brake are provided on the vehicle. One, controlled by a pedal, is of the contracting type and is applied to the exterior of a drum mounted on the drive shaft near the gearset. The second brake acts on the intermediate wheels, by means of the ap-

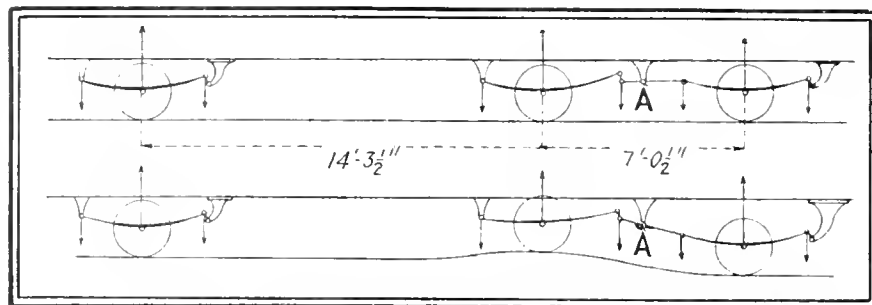


Diagram of spring suspension of six-wheel omnibus, showing at A the vertical equalizer

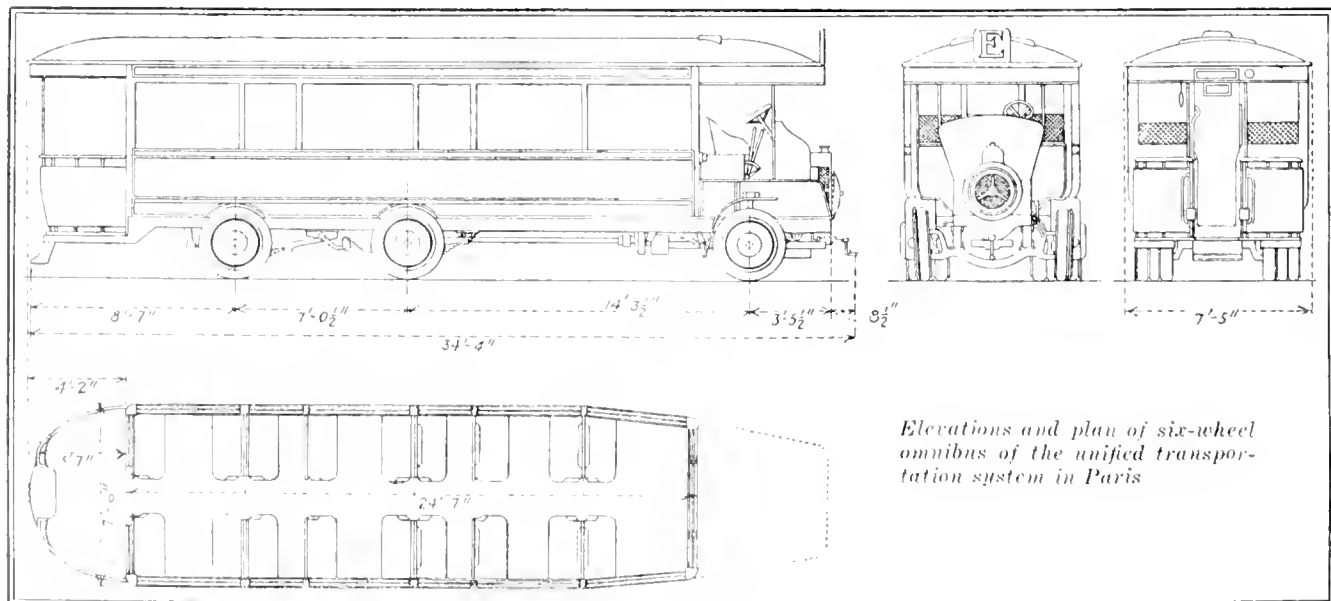
speed is 1,000 r.p.m. and the power developed is 34 hp. The distribution of gas is controlled in each cylinder by two superimposed valves, operated by a single camshaft. Three speeds forward are provided, and one backward.

The chassis carries an equalizing arrangement, for the purpose of distributing the load between the intermediate and rear axles. The principle is shown in an accompanying illustration. The equalizer, desig-

plication of wood shoes to a drum mounted on each driving wheel. This is operated by a hand lever and ratchet. The brake-lever ratio is 63 to 1. The auxiliary brake has a lever mounted on the rear platform, convenient to the collector, which permits operation of brakes on the intermediate wheels.

The bus is lighted by means of a generator, with an auxiliary storage battery, and it is heated from radiators using exhaust gases.

\*The Société des Transports en commun de la Région parisienne, the unified transportation system of Paris.



Elevations and plan of six-wheel omnibus of the unified transportation system in Paris





*Type of bus to be used on south side routes*

## The Chicago Motor Coach Company Sells Transportation

**The New Bus Line Makes Chicago the Hub of All Motor Bus Industry—Satisfied Patrons and Employees Are Essential Features Leading to the Success of the Enterprise**

**W**ITH the inauguration of bus service on the south side of Chicago, and the granting of permission by the Illinois Commerce Commission for similar bus routes on the west side, the Chicago Motor Coach Company promises to give to the city of Chicago the finest bus transportation system in the world.

Although the certificate of convenience and necessity for the south side lines was granted by the Illinois Commerce Commission several months ago, the company did not commence service there until enough buses were available to supply the expected need. This certificate from the commission gives the company until May 22 to put buses into operation, but service was actually started on April 15 on Route No. 1, shown on the accompanying map, with fourteen buses on a ten-minute headway.

The Illinois Commerce Commission has also granted permission to the company to extend the present north side service west from Clark Street and Wilson Avenue to Ravenswood Avenue, and back to Clark

Street, this being an extension of the present Wilson Avenue service. A five-minute schedule was started April 15.

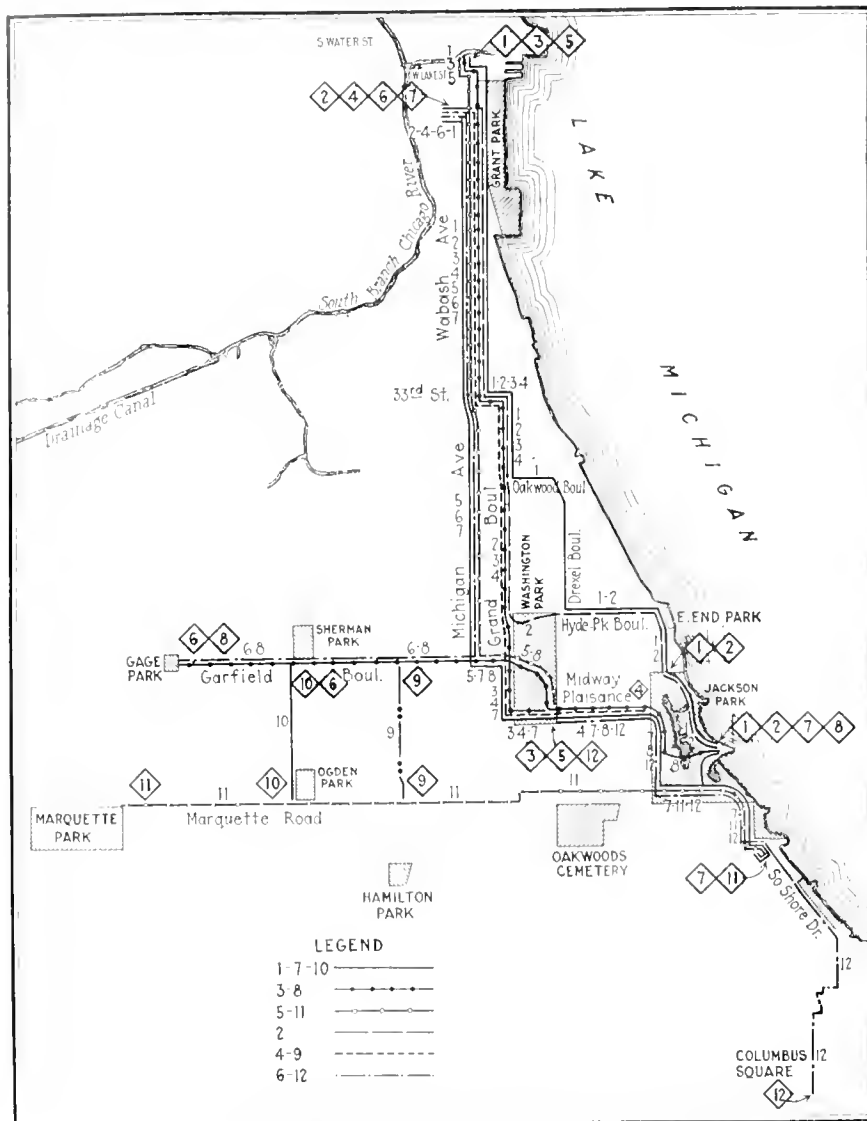
In view of this enormous expansion, which will ultimately mean 125 miles of bus routes requiring operation of 600 of the double-deck type motor buses, and 100 single-deck buses, the management faces the problem of selling transportation and keeping it sold through its salesmen—the driver and conductor or operator of each individual bus. To train and educate these men in a manner to inspire them with the spirit of co-operation characteristic of the company is the task recently undertaken by the assistant general manager, H. C. Moser.

At a recent get-together meeting of as many operators as were free to attend, and this amounted to about 85 per cent of the entire force, the management endeavored to instill in them the spirit of good fellowship, which is the first prerequisite to courtesy and salesmanship. At this meeting, which was held in the club rooms of the Chicago Motor

Coach Company, with the management facing a \$16,000 deficit for the month of March, an increase of 5 cents per hour in the wages of conductors, drivers, inspectors and dispatchers was announced. This increase took effect as of April 1.

Although many of the runs break under five hours, it was announced that five hours pay would be the minimum for each day, even though runs might work less than five hours, while those having runs which terminated in less than eight hours and more than five hours would be paid for the full eight hours. This increase, it is estimated, will cost the company in the neighborhood of \$40,000 per year, which is practically \$110 per day. It was pointed out to the men that economies must be practiced to meet this increase and that the company needed the full co-operation of each man.

Many possible operating economies suggest themselves which will result in definite daily savings. With the present gasoline consumption of 1,500 gal., at a cost of \$300 per day, and an average of practically 6 miles



Map of south side routes

to the gallon, an increase of only 10 per cent in this mileage, which is not very much, bringing it up to an average of 6.6 miles per gallon, would mean a saving of 10 per cent of \$300, or \$30 per day. While accidents are costing the company an average of \$100 per day, it has been proved by statistics that 98 per cent of all of these are avoidable, and it is felt that a reduction in accidents of 20 per cent can easily be effected. Twenty per cent of \$100 is \$20, a material saving that can be made entirely by being careful.

In the handling of fares the company loses about \$30 per day through fares that are missed or stolen. An appeal is made to the men to get rid of the thief, as no one wants a thief in the organization, and as far as the missed fares are concerned, as President Ritchie of the company said, "even the conductor loses those."

If all of these economies were

practiced, it would mean a saving to the company of about \$80 per day, and while this lacks about \$30 of equaling the \$110 increase in salaries, it is thought that this deficit can be made up through proper selling of transportation by the conductor and driver as partners in the business.

Service is to be made so attractive that it will draw additional patrons to the line. The men are given to understand that they are in a business, that they have their coach, which can be likened to a store, in which they are selling rides at 10 cents each. As there is a competitive store doing business between practically the same two points selling rides for 7 cents each, they will only be successful in their enterprise if they exercise the utmost courtesy.

Among the many features which are to be introduced in an organization of this kind are baseball teams, bowling

### Hourly Rates of Pay, Chicago Motor Coach Company

CONDUCTORS				
Year	Before Jan. 1, 1923 Cents	After Jan. 1, 1923 Cents	After April 1, 1923 Cents	
First.....	40	50	55	
Second.....	41	52	57	
Third.....	42	54	59	
Fourth.....	43	56	61	
Fifth and after....	45	58	63	
DRIVERS				
Year	Before Jan. 1, 1923 Cents	After Jan. 1, 1923 Cents	After April 1, 1923 Cents	
First.....	45	57	62	
Second.....	46	59	64	
Third.....	47	61	66	
Fourth.....	48	63	68	
Fifth and after....	50	65	70	
INSPECTORS AND DISPATCHERS				
Position	Before Jan. 1, 1923 per Week	After Jan. 1, 1923 per Week	After April 1, 1923 per Week	
Inspectors.....	\$35	\$45	\$48 50	
Relief Disp.....	35	43	46 50	
Depot Disp.....	35	43	46 50	
Loop Disp.....	35	41	44 50	
Edge Beach Disp.	35	40	43 50	
Receivers.....	35	40	40 00	

teams, checker and chess tournaments, while in the line of entertainment an annual ball and minstrel show has been planned. Regular social get-togethers, such as the first one was, are to be held from time to time in order to make the men feel that they are part of a great co-operating family. At a recent meeting of this kind, Mr. Moser spoke to the men in the following manner:

First, look out for your health. It is probably your greatest asset and it can be best taken care of by eating regular food. Do not eat too much, get plenty of sleep and above all things, get plenty of recreation. Look out for your general, personal appearance. It counts a great deal, as practically 70 per cent of the passengers on our coaches are women. And remember that your personal appearance tells the story long before you open your mouth to speak.

In our business, we are public servants, and when you come into the transportation business you are open to complaints and criticisms from the traveling public which you must meet with the utmost courtesy. It is essential that you cultivate the habit of being on time, for when a driver or conductor misses, and there may be no one to take his place, and hence the run does not go out, we are perhaps inconveniencing 500 patrons along the route who would have liked to ride.

A word about running on time. If you are behind time, make an honest effort to get on time, but do not take any chances. If you find that you cannot make up the time on a speed of 20 m.p.h., which is plenty fast enough, forget about the loss and while it is instinctive for a driver to feel a little sore when an inspector asks him where he was after he has made an honest effort to be on time, it is necessary for us to keep records of what time it takes to make the various trips.

There is absolutely no reason for a man running ahead of time, for such a

man is cheating the public, the company, and asking someone else to do his work. The figures show just what amount of service is needed. Under a five-minute headway, each bus that comes along on time gets its equal share of fares, but if a man is three minutes ahead of time, instead of a five-minute load he only gets two-fifths or 40 per cent of what he should carry, and the fellow behind takes 60 per cent in addition to his own.

From the time a man becomes an applicant for a position with the company, until the time he deems it necessary or wise to leave the company, he is constantly guided and instructed by the management. The job is made attractive to the man with the hope and realization that he in turn will try to make the ride of the patrons on the bus as attractive as possible.

In order to inspire the men to greater effort in the economy and operation of their buses, a series of three attractive flags has been offered as a reward to each man, each week, in each garage, who shows the greatest improvement in his own bus, and one also to the man with the best average miles per gallon of gasoline. As these flags will be transferred from one man to another each week, it was felt necessary that some credit should be given to a man, in the form of a permanent prize. This was done, and the man who accumulates 20 points receives as his reward a duplicate flag made of silk, similar to the first prize flag, with his name embroidered in the corner which he can permanently keep.

As a preliminary to the actual opening of the south side line, a run was made over the new route by five of the double-deck buses conveying

#### Comparative Operating Statistics, Chicago Motor Coach Company

	March 1923	March 1922	April 1922
Number of buses owned	92	93	23.9
Number of round trips	13,933	7,740	74.6
Number of passengers	843,128	474,221	48.14
Total mileage mileage	231,059	131,600	60.32

members of the Lions Club, who had previously held a meeting at one of the Chicago hotels. This expedition was made not only to acquaint the immediate members of the Lions Club, but also to familiarize the peo-

ple along the new route with the type of buses to be used, and where they were to run. Mr. Ritchie, president of the Chicago Motor Coach Company, in his address before the Lions Club, spoke at some length about the route, the new equipment and the manufacturing facilities for building the buses. He also spoke about the financial problems of the company, the need of traffic studies and schedule making and the salutary effect of the automobile promoting the health and happiness of the American people.

## Keeping Out of Traffic Builds Business

Mount Clemens Line Has a Terminal in an Outlying Section of Detroit at the End of the Main Trolley Line—Advertising in Newspapers and Also in Buses Draws Passengers

**M**OST bus operators try to get as close to the center of business or pleasure as they can. In some cases, however, it may mean greater profit if the terminal is at the outskirts, connecting with some other form of transportation. This is well illustrated in Detroit, where the Wolverine Transit Company starts its buses several miles out from the City Hall, at the point where most of the trolley cars finish their run. This arrangement, of course, makes it possible to keep the buses moving at good speed all the time, since they do not have to travel through the crowded section of the city to reach some downtown terminal.

The Wolverine Company seems to have two slogans, which it has expressed in print and by other methods. The first is, "Our buses meet

the trolleys." The other, "Comfortable, safe, enjoyable," speaks for itself, and is painted on the outside of the buses, as shown in the illustration.

During good weather six buses carry an average of 3,000 passengers a day. They make about 250 miles each day for seven days a week. The first bus starts out from Detroit at 4 o'clock in the morning and is due at the other end of the line, Mount Clemens, an hour later. The last one leaves Mount Clemens at twenty minutes after midnight, arriving at 1:13 a.m. in Detroit. The intermediate fare point, Masonic Boulevard, is just about half way, or a thirty-minute run from either terminal. The schedule provides for a twenty-minute headway all day until eight in the evening, then a thirty-minute headway for the next two hours, with an hourly headway thereafter. On this basis there is a seven-minute layover at each end, giving the drivers a chance to stretch their legs, and holding the bus long enough to attract business. Waiting-room facilities are available in small stores at each end of the line, but the buses leave so frequently that they are not required to any great extent except during inclement weather.

The through fare to Mount Clemens is 15 cents, with a 10-cent fare to any point south of Masonic Boulevard. The 10-cent fare is the minimum charge.

Within the last few months strip tickets have been used. These are sold by the drivers on the buses, fifteen of the 15-cent tickets for \$2, and the same number of the 10-cent tickets for \$1.25. This represents a

### EASTER GREETINGS

**T**O our patrons and to our prospective patrons, we extend cordial greetings. May we suggest that the Easter fashion promenade on Michigan Avenue and on Sheridan Road is best seen from the top of a coach

*The Chicago Motor Coach Company*

"Selling Transportation" placard



*Wolverine bus for thirty passengers with cushion wheels and tires*

25-cent saving on each purchase, and the number covers a week's riding, so that the passengers can invest in transportation at the time they receive their weekly salary or wages. It is estimated that about 15 per cent of all fare collections are tickets. To encourage the sale a weekly bonus of \$2.50 is given to the driver disposing of the largest amount of tickets. It is estimated that about 40 per cent of the total business goes through to Mount Clemens, the other 60 per cent, on the 10-cent basis, dropping off south of the Masonic Boulevard.

All fares are collected as the passenger enters, a Cleveland fare box being used. Coins and the two forms of strip tickets are all deposited in the box.

The Wolverine Transit Company believes in creating good will in the minds of the public as well as its passengers. Small advertisements, similar to the one reproduced here, are used in Mount Clemens and other town newspapers along the route. In the buses themselves small printed announcements are pasted on the windows, and larger placards attached to the outside of the bus, as shown in one of the photographs. The company believes that this is an important factor in developing business, although of course it does not neglect its equipment, or to provide service frequent enough to meet the public's needs.

The vehicles used on the Mount Clemens-Detroit line are built to the specifications of the Wolverine Transit Company, and are said to be the pioneers of the large long wheelbase type now used all over the country. The Wolverine fleet consists of two twenty-eight-passenger buses and four thirty-passenger. The former

have four-cylinder engines  $4\frac{1}{2} \times 5\frac{1}{2}$  and the latter six-cylinder,  $3\frac{5}{8} \times 5\frac{1}{2}$ . The fuel consumption, it is said, is about  $6\frac{3}{4}$  to 7 miles per gallon for the smaller buses, and about  $6\frac{1}{4}$  miles for the thirty-passenger type. The

### MOTOR COACH SERVICE

15-15c Tickets \$2.00      15-10c Tickets \$1.25

You save 25 cents on each strip.

TICKETS GOOD ALL THE TIME

16 2-3 Per Cent Interest on Your Money.

MOTOR COACHES ALWAYS IN THE LEAD  
TO SAVE MONEY FOR YOU.

DON'T FORGET—20 MINUTE  
MOTOR COACH SERVICE

### Buy Tickets

WOLVERINE TRANSIT CO.

9947 Gratiot Ave.

Lincoln 4644

*Newspaper advertising used by line  
near Detroit*

six-cylinder engine gives 42-hp. at 1,800 r.p.m., this corresponding to a speed of about 25 m.p.h. The carburetor is Zenith, the magneto of the Scintilla make, the drive at the rear is through a semi-floating Wisconsin

axle, of double-reduction construction. Wheels on the large buses are Sewell cushion, with Kelly-Springfield block or Swinehart cellular cushion tires. These are 36 x 5 front and 36 x 6 dual rear.

The thirty-passenger bodies are built by the Model Body Corporation, Detroit, of oak framing, covered with No. 20 steel panels, and moldings of  $\frac{1}{4} \times 1\frac{1}{2}$ -in. aluminum. The roof is Haskelite plywood, covered with 10 oz. oiled duck.

Four automatic ventilators are mounted in the roof, which is braced by tubular stanchions at the front and rear of the central aisle. Passenger signal buzzers take current from a dry battery mounted under one of the front seats; this being adopted to prevent burning out push buttons. The seating arrangement is of the city type, with longitudinal seats at the front and rear to provide space for standing passengers, as well as to increase the space available for quick loading and unloading.

Liability, property damage and fire insurance are carried on all buses. The passenger liability is \$5,000 for each passenger, or \$25,000 for any one accident. Property damage for \$1,000 and fire insurance to the amount of \$3,000 are carried. No collision insurance is maintained; the company believes it involves a let-down in responsibility and consequently carries this risk itself. On the daily basis the insurance charges are \$1.64 per bus, but since it is carried in a mutual company, the dividend may considerably lessen the cost. So far 25 per cent has been returned each year.

The Wolverine Transit Company is incorporated under the laws of the State of Michigan for \$75,000. Its officers are A. J. Gnich, president; C. Carey, vice-president; and George A. King, secretary-treasurer.



*Sales messages above windows and on lower panels*

Buyers of Buses on the Deferred Payment Plan Must Show the Legal Right to Operate, and Establish Moral Responsibility to Show They Have the Ability to Meet Their Notes as They Fall Due

## The Finance Companies Demand Assurance of a Good Risk from Motor Bus Purchasers

*By George McIntyre*

New York, N. Y.

**N**OT all credit corporations will accept bus paper, but those that make it a practice hold that the general conditions of collections on this class of installment paper where there is protective legislation affecting motor bus operation are better than on any other class of automotive paper.

In substance, the method of purchasing buses under a deferred-payment plan in all parts of the country is about the same. The dealer and purchaser sign a conditional purchase agreement whereby the purchaser immediately gets possession, but not title, of the bus by paying down in cash at least 30 per cent of the delivered price and signing a note for the balance, which is to be paid off in equal monthly installments. The period of time over which the note runs is mutually agreed upon between the dealer and the purchaser. This spread, however, is dependent entirely on the credit of the purchaser and his ability to satisfy the dealer's financing corporation of the safety of the note. Title to the bus, of course, is not made until all payments on the note have been completely fulfilled.

### PURCHASE AGREEMENTS VARY WITH LOCATION OF SALE

The form of purchase agreement used varies in detail according to the state in which the sale is to be completed. Pennsylvania, for example, takes the form of a "Lease," whereas in Colorado, Illinois, Louisiana, Missouri, New York and Ohio it is called a "Mortgage." In all other states it is called a "Conditional Sale Contract." In many states this mortgage must be filed or recorded like any other deed or property mortgage. This is true except for Arkansas, California, Delaware, Florida, Idaho, Indiana, Massachusetts, Michigan, Mississippi, Nevada, New Mexico, Oregon, Rhode Island, Tennessee and

Utah. These sale agreements or contracts are usually made out in quadruplicate, one copy being given to the purchaser, one is kept by the dealer, the other two going to the financing corporation along with the note it purchases.

### WHAT THE FINANCE COMPANIES DEMAND

The first essential on the part of the finance companies is to have correct assurance that the purchaser has the right to operate buses over fixed routes in accordance with the laws of the state and local communities through which the route is to operate. The reason for this safeguard is evident, for in the past many finance companies have been put to considerable trouble that cost them money. This was because they had been accepting the prospective purchaser's word alone that he held a local franchise or permit in his own name as well as the state certificate of convenience and necessity, where such was a condition of the right to operate.

A bus purchaser will find that the finance companies will be more willing to talk credit if he can show sworn affidavits from the city and town clerks and the secretary of the public service commission that he holds the necessary certificates to operate. Better still, it is advisable to have copies of the actual permits to give to the seller of the bus so that he can turn them over to the finance company along with the buyer's statement and note. This will serve to establish better mutual relations.

Unless the prospective bus purchaser can show that he has this legal right to operate the bus after agreeing to buy it the finance company is skeptical as to the safety of the promissory note. The finance company feels that the bus owner may be suddenly prevented from continuing operation, thereby cutting

off the source of revenue from which he obtains the necessary funds to make his monthly payments as they come due. In cases where service has been stopped and the bus owner has had a note outstanding the finance company has found it necessary and often expedient to extend the note pending the litigation preceding resumption of operation. Naturally for such an extension of time the finance company makes a charge. Oftentimes these litigation proceedings are long drawn out and are an inconvenience to the finance company, especially if there is no immediate prospect of a speedy settlement. It then becomes necessary in case of non-payment of notes to repossess the bus and to sell it for what it will bring in the open market in order to close up the account.

The second step that a financing company requires is that the prospective bus purchaser establish that he is of sound responsibility. This practice follows the well-defined plans of all credit financing companies to investigate and determine the moral responsibility of its clients.

### PURCHASER MUST SHOW HE IS OF FINANCIAL RESPONSIBILITY

The finance companies have a standard form, known as the Buyer's Statement, which they require the dealer to have filled out in detail for each bus sold on time. The form naturally shows the name of the dealer or seller of the bus, the purchaser's name and address and the business in which he is engaged. In case the purchaser is a corporation, information is requested as to the state and date of incorporation together with the names of the principal officers, their addresses, the amount of stock held and in what, if any other businesses, these officials are engaged. If it is a copartnership the names and the amount of interest that each has must be given. In both

instances the names of the banks in which the purchaser has accounts and a statement of his assets and liabilities, together with a description of the real estate owned, are also required. In other words, the buyer by this statement gives the finance company a picture of his worth together with what, if any, assignments, chattel mortgages or unsatisfied judgments are against him. Likewise the amount of insurance he carries on his property.

In addition, four references are required, and the finance company usually makes a personal request on each of them as to the financial and moral responsibility of the prospective purchaser. In some instances, in case the purchaser is an individual, it even goes so far as to investigate him locally to see if he pays his local personal household bills promptly or otherwise.

On this same form the dealer or seller gives information as to the type of bus purchased, the price of chassis and body, the amount paid in cash, freight charges and war tax, trade-in allowance, etc. The finance company also charges for service, in buying the note. These items added together give the total amount of the note for sale.

#### TRADE-INS OFTEN PRESENT DIFFICULTIES

Finance companies watch carefully all allowances for trade-ins of old equipment that enter into a deal for new buses. They investigate the seller, who may be a dealer, distributor or even a manufacturer, to determine his ability to carry supplementary paper, as it is called in the financing world, that is used to make up any deficiency in the total amount of the initial down payment that is demanded from the purchaser of the new vehicle. If the seller cannot measure up to the standards of the finance company, the purchaser had better go elsewhere to buy his vehicle.

This demand on the part of the finance company is really a protection for the customer, even though the seller assumes no responsibility in seeing that the bus is kept in first-class condition under the terms of the credit contract. It assures the purchaser, however, that he can obtain redress under the guarantee clause in the purchase contract for all new vehicles.

The bus purchaser must realize that his initial payment will be insufficient to justify the delivery of

the bus unless he can comply with all of the fundamental conditions of the financing plan. What the financing company really does is to protect itself against loss in every way possible in the event repossession has to take place during the first few months that the purchaser has the bus.

#### PAYMENTS SPREAD OVER LONG TERMS

The length of time that a bus operator has to pay his notes is worked out on the basis of the depreciated value of the bus. In other words, it is possible to buy a modern, up-to-date bus on a longer spread of payments than it is possible to purchase an ordinary passenger car. Usually the paper runs for twelve months, and often the transactions are for eighteen months. Irrespective of the length of time allowed, however, the payments are made on a monthly basis in equal installments to cover the balance due after the initial down payment. The length of time that a mortgage is valid varies in different states; for instance, in New York and New Jersey it is limited to twelve months. In these states it is customary after the twelfth payment to make a new note for the balance, for which a nominal fee is charged, spreading the balance due over six additional months. This in reality allows eighteen months in which to pay for the bus.

The mortgage or finance company also requires insurance protection from loss by fire and theft, as well as from damage due to collision. The risk from fire and theft, in itself, is almost negligible, but the risk due to collision, liability and property damages are continuously difficult problems confronting all finance companies.

Liability insurance, both personal and property, is not required by the finance corporation, but for the operator of buses it has been, and even now is, a serious matter; especially is this true of the strictly urban bus, for an analysis of the ratio of losses to net paid premiums for this class of risk indicates that in many parts of the country this is excessive. In the case of the intercity bus, however, the risk is somewhat less, but the insurance companies have so far failed to comprehend any difference in this risk.

The premiums for all of these policies except for liability is included in the financing companies' service charge and added to the pur-

chase price less the first payment. Many of the finance companies carry their own fire, theft and collision insurance and demand full premium rates, the same as the old line insurance companies.

The amount of fire and theft insurance usually demanded by the financing companies is equivalent to 80 per cent of the delivered price of the bus plus extras for accessories but exclusive of freight and war tax. So far as collision insurance goes, the purchaser must secure with the finance company a policy for the total delivered price of the bus, exclusive of freight and war tax with a deductible clause so that the first \$100 and in many cases the first \$200 of any loss is not covered.

From practical experience, some financing companies believe that this coverage is satisfactory. Others have even said that they have never known of a case where there was complete loss from fire or collision on a bus. If it can be shown that the risk feature remains negligible, it will perhaps be to the credit of those who are contemplating the purchase of additional buses on credit.

#### COLLECTIONS AND REPOSSESSION

The finance companies notify the purchaser usually five days previous to the day the monthly payment falls due. If a purchaser is unable to meet this monthly payment he can ask for an extension, which will usually be granted by the finance company provided he has a good previous record of payments. This extension, however, costs him a small fee, based largely on interest and insurance premiums.

In case payment or notification is not forthcoming to the finance company the day following the payment is due a second notice is mailed. After five days have elapsed and the finance company still receives neither money nor notification a third notice is sent. If no response is received within the next ten days, either in person or by correspondence, a letter of demand is mailed calling for payment within twenty-four hours. Nothing forthcoming, the next step is to send a local constable to seize the bus. The constable, of course, attempts to make a peaceful collection, but, failing, takes repossession, and stores the bus in a local garage and posts the necessary notice of sale, which in New Jersey cannot take place within ten days after seizure and in New York not for twenty days. The finance company at the sale buys in



the bus for the outstanding portion of the note due and turns the bus over to a dealer to resell. The finance company, however, stands no chance of losing by any such transaction for the original dealer or seller of the bus has guaranteed the finance company against loss by indorsing the

purchaser's note, made at the time the bus was turned over to him.

So far it has been difficult to use this particular kind of automotive installment paper for rediscounting purposes. Few banks as yet look with favor on this kind of installment paper, yet when protected as out-

lined above, it should appeal more and more to the few favorably inclined toward rediscounting of the paper, in the ratio that installment paper, as a whole, becomes more attractive not only to the banks, but possibly to other institutions, including the Federal Reserve Bank.

## How Buses Can Be Bought on Time

By Lawrence Swan

Detroit, Mich.

**T**HE old saying, "Money makes the mare go," now has an ultra-modern variant: "*Credit makes the bus go!*" Despite Solomon's famous dictum to the contrary, there is something new under the sun, and in this particular instance this something new is the current adaptation of credit principles to the distribution of motor buses.

Demand and supply in any given industry do not always keep step with each other, or with their own financing. Growth in that industry may be so rapid as completely to outdistance money and credit. The automotive industry, for instance, expanded so rapidly from 1910 to 1914 that existing financial machinery found itself unadjusted to its amazingly growing needs. Up to 1912, or thereabouts, the absorption of the product was chiefly on a cash basis. Thereafter, volume outgrew its money base. Traditional banking did not rise either to the occasion or the opportunity. Going into debt for an automobile was regarded as an extravagance. So-called automobile paper was looked upon with none too much enthusiasm.

### THE FINANCE COMPANY

As might have been expected, the needs of the situation were met by a new type of financial house, especially adapted to the requirements of the job to be done. In 1914, and subsequently, the so-called motor finance companies began to appear, the business of which it was and is to assist in the financing of the distribution of automobiles, trucks and tractors on a time, or deferred-payment, basis. As a result largely of this impetus, the industry took gigantic strides forward.

The technique, or method, of these

**Motor financing or credit corporations are adapting themselves to the needs of the bus operator. It is now possible to purchase buses on a deferred payment plan for 5½ per cent of the retail price. This plan, however, calls for a twelve-month full payment with one-third as the initial down payment. Premiums for fire and liability insurance are in addition.**

companies is generally known. The purchaser of the automotive equipment pays down part of its cost, giving his installment notes for the remainder, to which has been added a reasonable flat service charge, interest and the cost of insurance coverage. In return, the finance corporation buys the car or the truck, permitting the ultimate owner to use it while paying therefor, and taking a chattel mortgage on the property to protect itself during the life of the loan. The resultant commercial paper is either discounted or made the basis of note issues, which, when marketed, returns the company's differential investment in the transaction in liquidated form.

That the application of this type of credit is sound has been proved in practice. A vastly enlarged volume of business has been made possible. It is a truism that nine-tenths of the world's business is done on credit. To attempt to continue the financing of motors on substantially a cash basis would have been stupid and economically unwise, and their development would have been seriously retarded.

The motor bus has accepted fact today. Within a few brief years motor buses have become omnipresent—you see 'em wherever you go, and they likewise go wherever you see 'em. The business has reached tremendous proportions. It is, in reality a gigantic industry within an industry. It was to be expected, in view of this stupendous development, that credit facilities would not at first grow correspondingly.

While the general truck and pleasure car field are at present provided with adequate time-financing machinery, the same is much less true of the motor bus division. Any number of motor finance companies exist to meet general needs, but at this stage of the industry few exist with special reference to the requirements of this important sub-field as not all financing companies will handle motor bus paper.

Conditions are by no means identical. Both the buyer and the equipment have marked differences. For instance, the unit cost is much greater as regards buses. A pleasure car or a truck ranges in price from \$500 to \$5,000, while the motor bus starts at about \$3,000 and may cost as high as \$10,000 or \$12,000. Again, the bus operator on the average is not so strong financially as the buyer of equally costly truck equipment. The reason is not far to seek.

The bus industry is still in its infancy. It is believed that fully 85 per cent of those who run buses are individuals or partnerships. The day of corporate bus operation is on the way, but the business at present is still largely individual. The big operator today was the jitney driver of yesterday. The roomy, comfortable, luxurious motor bus we see

today in increasing measure is a recent evolution. Its great-grandfather was the flivver jitney; its grandfather was the carpenter-built body-on-a-truck-chassis, while its immediate ancestor is the more recent attempt at distinctive motor bus construction. Which is all but another way of saying that the bus operator-buyer has had to finance his improving equipment largely out of his own earnings.

Reference has already been made to the way the small operator formerly had to get his equipment. If he could utilize local credit and borrow at the bank, *that* helped; if he could get somebody to go "accommodation," that also helped. The most substantial form of assistance, however, came from the manufacturer of bus equipment. The bigger, better concerns have extended credit lines to the extent that their manufacturing activities were crippled. They have extended millions of dollars of credit annually to dealers and to purchaser-users, thus doing general financing as well as manufacturing. In no other big way could the distribution of their output be financed.

#### AN EXAMPLE FROM THE PRACTICAL SIDE

The foregoing may be, for many readers, largely academic — mere historic discussion. Of far greater importance is the logical question of "how does it work in practice?"

Suppose you, Mr. Reader, are operating a small fleet of buses. You want to buy another—a more modern one—to replace one wearing out or for purposes of expanding your business. Let's see what the bus financier can do for you.

For ease of figuring, suppose you have selected the type of bus you want and that it has a retail tag on it reading "10,000." Of course, you may not have to buy retail. You may be in a position to buy wholesale, or get some dealer to waive or shave his dealer's commission—in which case, you save 10 or 20 per cent. Fine! But, if not, what?

This is how it figures:

Agreed purchase price.....	\$10,000 00
Initial down payment (cash).....	3,333 00
Balance on yearly terms.....	\$6,667 00
Service charge (5 per cent on that balance).....	333 33
Interest on average outstanding amount.....	216 66
Insurance (fire, property damage, public liability coverage carried during life of loan) premium thereon.....	500 00
Total balance owed on equipment.....	\$7,717 00

For this the purchaser gives a series of twelve installment notes of \$643.08 each, one maturing each month, so that the entire obligation is paid off in one year.

That amount, plus the initial down payment, brings the total bus cost up to \$11,050. "What!" shrieks the bus man, "pay a premium of a thousand dollars just to buy a bus on time! You're crazy," or words to that effect!

Analyzed, it is not so bad as that, and really not bad at all. On the contrary, it is rather reasonable, and here is how one financing company does it.

You would have to have your insurance anyway. You'd pay the same price no matter where you got it. So the \$500 insurance item may be deducted for it really is an operating, not a financing, charge. You are insured as an added protection to the company while you owe it money, of course; but it is an operating charge, the same as tires or fuel. That brings the total cost down to \$10,550—the \$550 being the financing costs exactly, or 5½ per cent on the total cost—certainly not an unreasonable or exorbitant charge for the privilege of paying for equipment out of its earnings.

#### WHAT THE FINANCE COMPANY GIVES AND GETS

Now, from the standpoint of the credit company, the corporation carrying the load, how does it work out? How much money does it make? How about the safety element?

Its normal profits are easily figured. They consist of

Service charge (figured on the above deal).....	\$333 33
Interest on average outstanding amount at 6½ per cent.....	216 66
Insurance brokerage.....	100 00
Total.....	\$650 00

with interest charged only on the actual amount owed. It therefore is neither a charge on the initial payment of the buyer, nor yet on the profits of the financing.

#### FINANCING ON EIGHTEEN-MONTH BASIS

The foregoing tabulation shows how the bus financing transaction works out on a yearly or 12-month basis. Often, longer and easier terms are desirable, however. The following schedule has been worked out on the basis of 25 per cent down, and the balance in eighteen monthly installment notes:

Agreed purchase price.....	\$10,000 00
Initial down payment (cash).....	2,500 00
Balance on 18 months' terms.....	\$7,500 00
Service charge (5 per cent on this balance).....	375 00
Interest on outstanding average amount.....	237 50
Insurance.....	500 00
Total balance owed on equipment.....	\$8,612 50

For this the bus buyer gives a series of 18 installment notes of \$478.47 each. In this case the purchaser pays a total, exclusive of insurance, of \$10,612.50, or about 6½ per cent. This is a little better than 4 per cent a year for his total financing; or something in excess of 5 per cent per year on his investment other than the initial down payment.

#### DEALER'S PROFIT

An auxiliary, but incidental, source of profit is the dealer's commission which may be taken by the finance company. In the event that the finance company also acts as dealer or vendor, in the absence of any middleman or distributor, it is entitled also to the usual dealer's commission. The commission would normally go to the dealer, and consequently is no added charge to the retail buyer. In many cases, the credit company makes no such profit, and in reality it is not an inherent part of deferred payment service.

#### TURNING FUNDS

It is by capital turnover that the finance corporation makes its real profits. The return that a single transaction yields is relatively small—but, multiplied by several turnovers annually, the aggregate profit is quite satisfactory.

The finance company can effect a turnover in two principal ways. It usually can discount its commercial paper, for it is of the "two-name" variety and discountable generally at banks and elsewhere. Or it can deposit the mortgages securing equipment against which loans are made with a trustee and issue collateral trust notes, the sale of which puts back invested funds into liquid form for further profitable investment. Ability to turn capital readily not only means enhanced profits for the finance corporation, but means that more customers can borrow and more equipment be placed.

#### SECURITY

The type of commercial financing thus described is a form of commercial banking. Many of the usual banking safeguards are thrown about the transaction. The finance concern takes little chance.

In the first place, such concerns do not loan to every and any one. A bus buyer must be a good risk. He must be able to show a clean record. Second, the concern requires that his notes be indorsed. "Two-name" paper is the general rule. The manufacturer of bus equipment often is willing to put his name on paper of this sort. The risk and bother are much less than under the old form where he had to carry all the load unassisted—that is, the credit load. In the third place, the company takes a chattel mortgage on the equipment itself. The company's equity usually is less than the forced value of the property.

Again, insurance is required. Policies are indorsed in favor of the lender until such time as the obligation is discharged. Companies also are learning by experience. The

business of deferred motor financing is a real business and latterly has crystallized into standardized form.

#### GENERAL SERVICEABILITY

What is it that justifies the motor bus finance company? *Serviceability*.

As regards the motor bus operator, it:

- enables him to buy modern equipment on credit with small cash outlay.
- permits him to pay for most of his equipment out of earnings.
- allows him to consummate all details of purchase, financing and insuring in a single operation.
- provides him with modern, standard equipment rather than the cheap, flimsy kind he would be forced otherwise to buy with limited cash.
- by helping to provide good equipment, tends to insure him good patronage, low operating and replacement costs.

For the manufacturer, it

- extends credit by means of which buyers acquire his motor buses.
- enables him to use his own capital

and credit in manufacturing rather than in helping to finance their buyers.

Second, there is a large actual credit liability help to simplify the operation problem.

permitted him to sell more of his product for a profit.

And lastly, for the motor bus user, it

*directly* it enables him to own a comfortable, safe car to ride in, provides him higher quality of service, provide him with liability insurance while being carried in a car not yet paid for, tends toward maximum safety and convenience.

And, in so doing, the bus finance corporation gives ample and compelling reasons for its existence as a permanent and important part of a rapidly growing industry and as a specialized phase of the world of finance.

## The Pacific Electric Finds a Place for the Bus

**Railway Now Operating in Five Southern California Cities Has Recently Purchased Eighty-one Additional Buses—Co-ordinated Bus and Rail System to Be Installed in Pasadena—Bodies Being Built in Company's Car Shops**

THE policy governing the operation of motor bus lines by the Pacific Electric Railway calls for co-ordination with its rail lines. Motor bus routes have been established to date in six places in conjunction with or as feeders to the trolley lines. These bus lines reach territory either not reasonably served by the traction lines or where the construction of tracks is not yet warranted due to lack of sufficient traffic to justify the necessary investment.

In addition to the bus system already operated in these five southern California cities, plans have recently been perfected for a sixth installation—in Pasadena, where forty-five buses will be operated. The railway also has pending before the City Board of Public Utilities an application for bus service in Los Angeles, and that future bus operations on a large scale are planned by the company is indicated by the railway's recent purchase of eighty-one White chassis. This deal is said to have been the largest single transaction in the history of the motor bus.

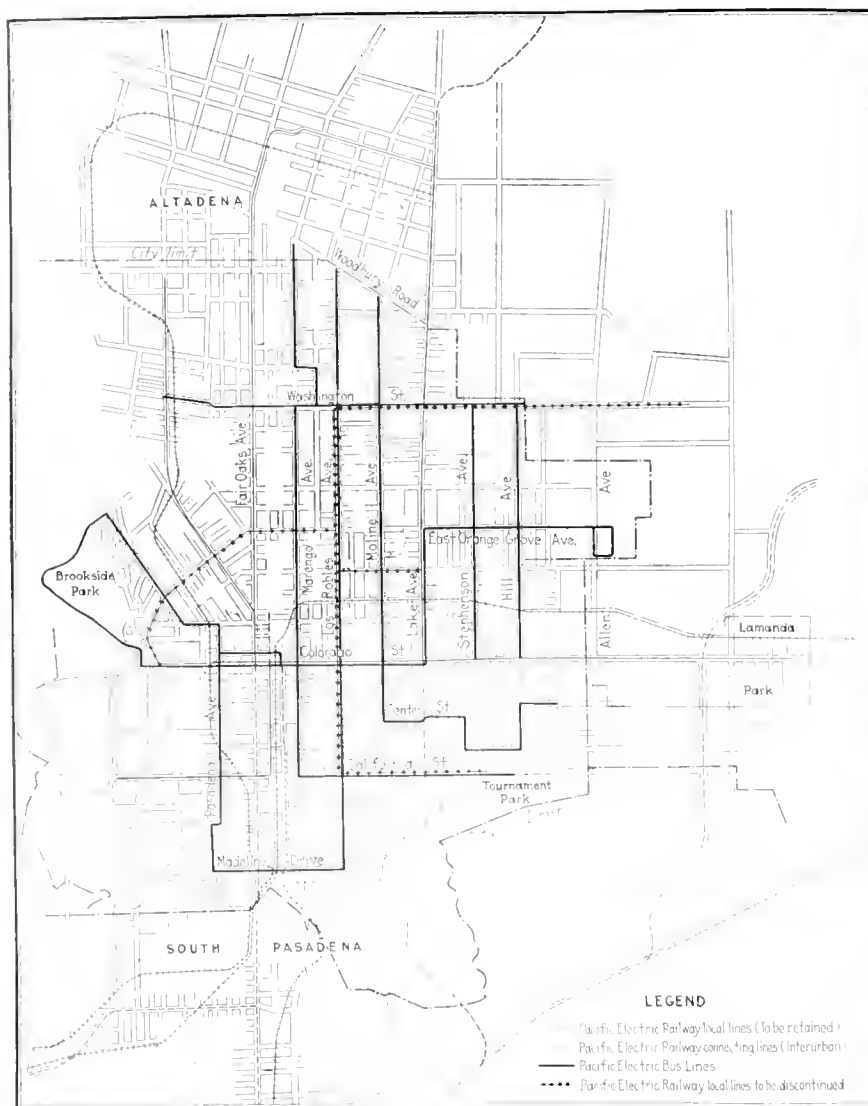


*New standard bus adopted by company. Special Motor Co. White chassis.*

The bodies for these new buses will be constructed in the railway's car shops at Torrance.

The first venture in motor bus operation was in 1917, when a line was established between San Bernardino, Highlands and Patton to supplement the interurban line between the same points. The two routes follow entirely different highways,

which in some cases are nearly a mile apart. The distance between San Bernardino and the Patton terminal of the bus line is 6.6 miles. In this instance, interchangeable tickets are sold on a mileage basis that are good going on the bus line or returning on the interurban trolleys or vice versa. One-way fares are based on 3½ cents per mile with



Map of Pasadena showing present and proposed street car and bus lines.

round-trip rates at  $3\frac{1}{4}$  cents per mile. Three Reo twenty-passenger buses of 27-hp. capacity are used to fill the schedule, which calls for a two-hour average headway. For the six months ended Dec. 31, 1921, the line handled an average of 6,814 passengers per month.

The second installation was in Redlands, Calif., a town of 9,500, where a route was established on Sept. 1, 1921, in connection with the local trolley lines. This bus line serves a section of the town and the University of Redlands that hitherto had been without local transportation facilities. The route in question is but one of natural development and its operation eliminates the necessity of building a mile or so of track. The length of the line is 1.7 miles, over which thirty-minute service is given by a twenty-passenger Moreland 27-hp. bus. The fare is 10 cents with seven rides for 50

cents and free transfers are interchanged between street cars and buses. For the six months ended Feb. 28, 1922, this bus line averaged a monthly haul of 7,847 passengers.

The third installation of bus service was in Glendale, a city of 20,000, in January, 1922. This bus service likewise connects with the business district two outlying portions of the city heretofore without trolley service. Thirty-minute service is given over the entire route, which has an approximate one-way length of 3.5 miles. It takes three buses of the Moreland type in this service to fill the schedule. Five months after the line was opened the monthly traffic amounted to 9,655 passengers. The fare is 6 cents. Mention was made of this installation in the January, 1922, issue of BUS TRANSPORTATION, page 69.

The fourth installation of buses was in Santa Ana, a city of 18,000,

about 35 miles from Los Angeles. Here a ten-year franchise covering three routes of 10.27 miles of streets was purchased from the city for \$1,000 in February, 1922. Service was started on Aug. 1 last on each of these three routes, which have a combined length of 14.4 miles. Three types of buses are used, Reo Speed Wagons having a capacity of twenty-two passengers and a Moreland model having a capacity of twenty seated passengers. This type of bus was designed and constructed especially for use in Santa Ana. A White bus is also used.

A schedule of thirty minutes has been established on each route. Heretofore the only local transportation service rendered was by the interurban trolley line, which ran through the city. This bus service is intended to supply the much-needed local service.

The Pacific Electric Railway on Feb. 19, 1923, commenced bus operations in Alhambra, a city of 12,000. The bus routes form a loop around the city and thirty-minute service is maintained. The fare charged is 6 cents with free transfer privileges to or from buses or street cars within the present city fare limits. The railway does not operate local street car lines in Alhambra, but that city is connected with Los Angeles by its interurban lines, which perform the local service within the city. Three White buses, one of which is available for emergency, are in service. These buses, which cost \$8,000 each, are the results of several years of extensive study and investigation by the company with a view to obtaining a standardized bus to be used as feeders to main lines and for local service where the volume of traffic did not justify the installation of rail lines.

Embodied in this newly adopted standard bus are many new features and it is the company's belief that this new type of bus is ideally suited to meet the variable road and weather conditions encountered in southern California. Among some of the outstanding features are: Window curtains, which slide in a pocket in the roof; unusually low steps and wide entrance; electric dome lighting; extra wide and roomy seats. All buses are equipped with pneumatic tires and a novel spring suspension, which insures comfort of passengers. Their seating capacity is for twenty-five passengers.

Pending six months or more of negotiations, complete plans have recently been announced for co-ordinated street car and bus service in Pasadena. The details of the project have now been agreed upon by the City Board of Directors and officials of the railway.

The new bus "feeder" service will go into effect in April, at which time the first buses of the company's order of Feb. 16 for eighty-one model 50 White chassis are subject to delivery. This purchase was announced in the March issue of BUS TRANSPORTATION.

The buses to be operated in Pasadena will run under permits only, as no long-term franchises are granted by the city. The present independent bus lines in Pasadena are to be

dence of heavy travel a ten-minute bus service will be given from 6 a.m. to 10 p.m. and a ten-minute headway on other heavily traveled routes will be effective during the morning and evening peak hours.

Under the terms of the agreement between the city and the railway, after service is installed traffic checks will be made of all lines and additional service provided should the traffic warrant it.

The plans call for the use of forty-five buses, thirty-eight of which will be in active service and seven held in reserve. The buses, which have a seating capacity of twenty-five passengers, are the same type as operated in Alhambra, described in a preceding paragraph.

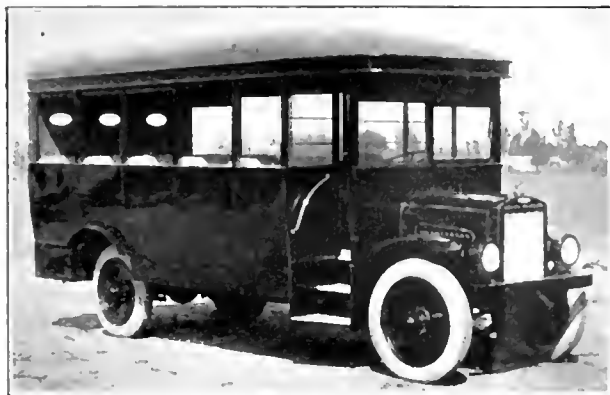
According to present plans, street

with through service to the elementary school and Institute of Technology, located in the southeast section. The round-trip distance of this route is 8.2 miles.

The agreement also includes a reduction in fares for school children to 3 cents by the purchase of a book of tickets. All reduced fares include the privilege of transfer within the city from either buses or street cars.

On a general average the bus schedule will range from five to twenty minutes on the various lines. It is also expected that owl service will be given on the buses to all sections of the city.

The Pacific Electric and Los Angeles Railways early in February formed a joint bus company known as the Los Angeles Motor Bus Com-



*The latest type Moreland bus, which is being used in Santa Ana, was especially designed and constructed for the Pacific Electric lines*



*Interior of twenty-two passenger body mounted on Rio Speed Wagon Model F chassis. The body was built in Los Angeles*

purchased by the Pacific Electric Company. The proposed system will give Pasadena, which has a population of 50,000 people, a transportation service unsurpassed by any city of its size in the United States, according to a statement of the City Board of Directors.

The local fare within the city will be 6 cents, with privilege of transfer. By the purchase of a block of ten tickets the rate of fare per mile can be reduced to 5 cents. These rates will become effective at the inauguration of the bus service. The schedules of buses and street cars will be so co-ordinated that in many instances a greater frequency of service than has heretofore been given will be provided. The buses will serve districts not previously served by either the street cars or the existing bus lines. Ten different bus routes are planned. On one of the proposed routes that gives evi-

car service on some of the more important lines will be continued, while on other lines the service will be withdrawn and succeeded by bus service. None of the railway lines removed from service will be physically abandoned until the proposed bus and street car system is thoroughly tried out; some of the tracks must be relaid if car service is to be continued. When any of the tracks are removed the roadway must be put in good repair by the railway. The railway has at present approximately 40 miles of single-track local car lines in Pasadena.

The ten proposed bus routes will reach downtown points without the necessity of changing from buses to cars, except the crosstown Washington Street line.

One of the outstanding features of the proposed system is the installation of crosstown bus service on Washington Street from Lincoln Avenue on the west to Sierra Bonita on the east. Another feature will be the operation of the South Pasadena-East Colorado-Tournament Park line which will provide students residing in the southwest section of Pasadena

pany, and in the name of the new company submitted to the Los Angeles Board of Utilities an application to operate feeder service in Los Angeles. The company has under consideration extensive bus operations in Los Angeles, which are held in abeyance pending a result of the several petitions now before that city. The situation, which involves three applications, namely, that of Eastern financial interests represented by W. G. McAdoo, the Glendale Motor Bus Company, and the railway subsidiary, was discussed on page 153 of the March, 1923, issue of BUS TRANSPORTATION.

All of the motor buses operated are of the "pay-as-you-enter" type, for one-man operation, with Ohmer cash registers. The lines are operated by the Pacific Electric Land Company, a subsidiary of the Pacific Electric Railway, in order to escape payment of the state corporation tax of 5½ per cent of gross revenue paid by

electric railways. This layout of motor bus equipment now serving the five above-mentioned points consists of fifteen buses. The eighty-one new buses contracted for will increase the railway's bus equipment to ninety-six. Their maintenance problems are treated in the same

manner as those of the street cars and are assigned to the mechanical department for maintenance and upkeep. Where there are no carhouse facilities available for housing and repairing, a company-owned garage and equipment for their accommodation are planned.

## Use of Buses Recommended in Los Angeles

**The Local Utilities Board in Recent Report on Transportation Improvements Advocates Wider Use of the Motor Bus as Feeders to New and Existing Rail Lines**

THE Board of Public Utilities of Los Angeles, Calif., which for the past eight months has been studying traffic conditions in and about Los Angeles, on March 20 rendered an exhaustive report setting forth its conclusions for the improvement of transportation facilities. The report was signed for the board by Walter R. Leeds, president; J. P. Kennedy and E. F. Bogardus, Commissioners, and F. A. Lorents, chief engineer.

One of the principal recommendations was that the two railway companies, the Los Angeles Railway and the Pacific Electric Railway, install twenty-four motor bus lines totaling 82 miles in length to serve portions of the city heretofore without adequate transportation facilities. Some 10 miles of double-track extensions to existing rail lines of the two companies was likewise urged.

These motor bus routes will take at least fifty vehicles, costing from \$6,000 to \$8,000 each. The report further recommends that the two railway companies abandon their "gentlemen's agreement" and allow the Los Angeles Railway to extend into Hollywood. A subway is also urged in Los Angeles for the inter-urban cars of the Pacific Electric Railway.

The completion of this extensive program, including increased car service, will cost approximately \$4,000,000, of which \$350,000 will be for motor buses and \$1,700,000 for tracks.

The report favors universal free transfers at all points of contact, both between rail lines and bus lines, irrespective of ownership. It even urges unification of the two railway systems. These two features, however, are subject to the jurisdiction

of the California Railroad Commission.

Commenting on the use of motor buses, the report states:

The use of motor buses as auxiliaries to our existing street car service is a foregone conclusion. The vast cost of maintenance of the rail lines, including the upkeep of tracks, paving rights-of-way, erection of substations for the generation of power and the high cost of same, to which is added a very large sum in the form of depreciation, are all factors that will occasion the installation of bus line service. Such service will greatly assist in solving our transportation problems and if efficiently operated will prove to be the most important adjunct to our present rail system.

It is estimated that 4½ cents of each 5-cent fare that is taken in on the street cars is expended in the manner stated above. Moreover, street cars move slowly and deposit passengers in the line of traffic, while buses receive and discharge passengers at the curb. The bus is a utility within itself. It generates its own power, is flexible, accommodates as many people as the street car, moves more quickly and in every way is more adapted to the needs of the traveling public. Less than half of each bus fare is consumed in the maintenance of this system, hence a greater profit and better service.

The board states in its report that no action will be taken on the application of the Peoples Motor Bus Company until after the May 1 election, at which time the question of the repeal of the 1916 ordinance which put the free lance jitney off the streets will be voted on. At the same election the fate of the 62-mile franchise over the city streets will be determined. Mention of this franchise was made in April, 1923, issue of BUS TRANSPORTATION, page 205.

The board was not unanimous in respect to the arguments regarding the use of motor buses. Commenting on that part of the report, President Leeds stated:

I do not approve what is said in the report about motor buses. Experience of approximately fifty cities of the United States for the past few years has shown the following conclusions in regard to motor bus operation: (a) Motor buses as substitutes for street cars in heavy traffic areas are not satisfactory; (b) motor buses competing with the street cars generally result in inferior service on the car lines with increased fare, which causes public reaction against such competition; (c) motor buses, where operated as feeders by rail carriers in new territory not yet able to support street car service, are found to be satisfactory; and (d) motor buses are most economical where traffic is comparatively light.

In his comments President Leeds further states that while universal transfers are desirable, their use will result in increased fares; and also that the Board of Public Utilities should not be made the catspaw to force the street railways to extend either their rail lines or to operate buses as feeders to help the promotion of new real estate subdivisions.

### No More Wet Bus Seats

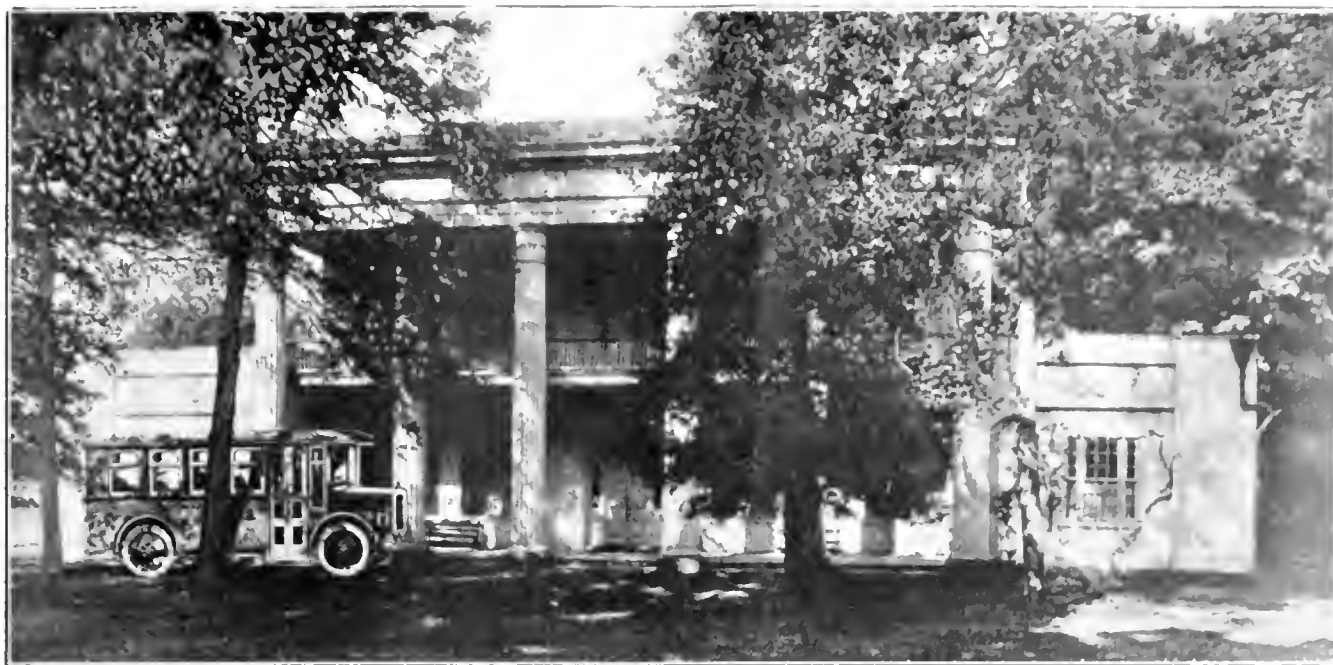
A CERTAIN English blacksmith, now unemployed, has evidently been inconvenienced by the combination of open-deck buses and rainy weather supplied travelers in London. Ignoring the weather as perhaps beyond control, this blacksmith,



*Device for keeping bus seats dry*

White by name, has invented a cover for seats and backs. This is arranged so as to disappear into a case when not in use, and to be drawn out into position and fastened when required to cover the wet seat or back. In the accompanying illustration is shown the inventor with a model of his device, showing the method of operation.





*The motor bus serves as the principal means of transportation to The Hermitage, General Andrew Jackson's homestead, which is just outside of Nashville*

## Old Hickory's State Has Bus Operation All the Year Round

**Knoxville and Memphis Most Important Centers—Mining, Lumber and Farming Are Principal Industries—Host of Proposed Legislation with Two-Cent Gasoline Tax Recently Passed and in Force—"Travel by Bus; It Is Safer, Cheaper and More Sanitary," Is the Slogan in and Around Chattanooga**

**I**N TENNESSEE, where the memory of General Andrew Jackson—"Old Hickory," as he was affectionately called—is enshrined forever in The Hermitage, his old mansion now made into a museum, bus transportation is admittedly in its infancy. Already, however, there are some thirty-seven lines running into Knoxville, carrying a million and a half passengers a year from points as far as 55 miles away. Memphis, Nashville, Chattanooga and other places are also active centers, where the bus serves the people engaged in farming, mining, lumbering or manufacturing, in all of which the state is rich.

Radiating from Chattanooga and reaching points in its immediate vicinity there are fifteen bus lines according to Haley's Official Bus Line Time Table. The buses on these routes cover a road surface of 400 miles, operate 2,000 bus miles per day

and carry more than 750,000 passengers annually.

The winter months have little effect on bus transportation, since the weather is mild the year round, and there are few snowfalls. In the eastern part of the state railroads are few, and interurbans still fewer, so the bus affords the only transportation to the cities and towns, for trading or railroad connections. Even where the bus parallels the railroad, the service is often preferred to the trains, as the fares are about the same, or in some cases less, and the schedule is decidedly more frequent.

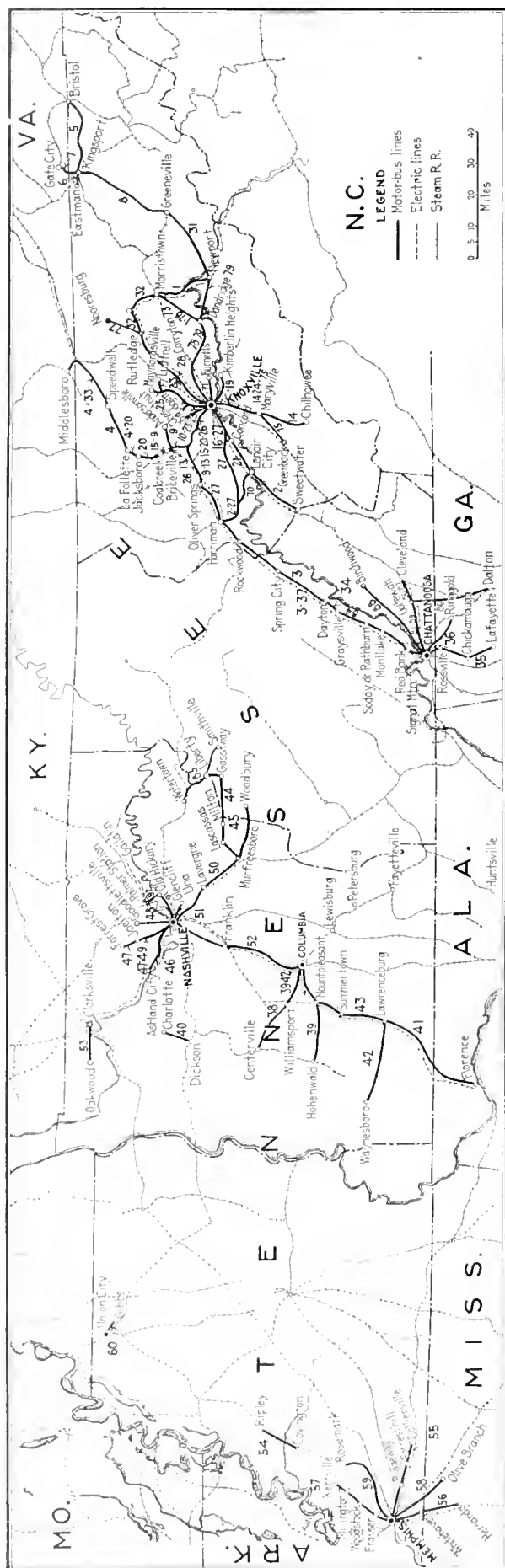
"Travel by bus; it is safer, cheaper and more sanitary." That is the slogan of the bus operator in Chattanooga and vicinity.

The growing possibilities of interstate operation are also suggested by the bus systems shown in the accompanying map. From Chattanooga, lines run south to Lafayette in the

state of Georgia, and north through Knoxville without a break to Bristol on the Virginia state line. From Bristol service is given to Bluefield and thence into the central part of West Virginia, so that four states, Georgia, Tennessee, Virginia and West Virginia, are linked by an unbroken series of bus lines. No attempt as yet has been made to coordinate schedules to avoid waits at connecting points.

The Tennessee lines given on the map are described in the accompanying table. This shows that some ninety lines, operating 180 vehicles, are now giving scheduled service over 2,400 miles of highway.

A typical example of Tennessee operation is that carried on by the Puckett Auto Bus Company, which has several lines from Murfreesboro. This started in 1921 with one Reo bus, when the state highway to Nashville was completed. Now there are



four Reos, with sixteen-passenger McKay bodies, on the 32-mile Nashville route. Six trips a day are made, the first bus leaving Murfreesboro at 6 a.m. and the last from Nashville at 11:45 p.m. One way the fare is fifty cents; the railroad charges \$1.06. The route follows the Dixie Highway, which is used extensively by southbound tourists, passing the National Cemetery, where soldiers of the Civil War are buried, and the other forts, monuments and remembrances of the days of '61. The sight-seeing business is also active at Chattanooga, for trips to Lookout Mountain, Chickamauga Park and other historical points.

Another line that should be mentioned is that of the Keeton Auto Service Company, which was inaugurated in 1917, during the construction of the government powder plant at Old Hickory. Five seven-passenger touring cars are operated on regular two round-trip schedules to and from Nashville on a 50-cent fare, except for the extra 11 p.m. trip on Saturday night, when the fare is increased to 75 cents. This route was important during the World War and served the powder plant employees. This government property is now being developed into an industrial center and the bus line serves to make Nashville easy of access. Trips are also run from Old Hickory to Palmer Station to make trolley connections via the Union Traction Company to Nashville and Gallatin. The fare in this instance is 25 cents.

#### HIGHWAYS IN TENNESSEE

The number of operators in the state has increased greatly with the building of good roads, and in many cases the completion of a state or federal-aid highway has meant a new bus line over the route. Although Tennessee has not built roads as rapidly as many of the Eastern and Northern states, the ones built are of a high-class and permanent form of construction.

Plans are on foot for a most ambitious program of highway construction. At the biennial session of the legislature just adjourned the bill which would have authorized a \$75,000,000 bond issue for a complete highway system of 4,000 miles was defeated in the House by a small majority after it had passed the Senate. This plan was backed by the Tennessee Good Roads Association, which maintains an office in Nashville and a field organization throughout the state. The association, notwithstanding the defeat, plans to keep up its efforts for securing a complete road system and it is not unlikely that it will be an issue in the next legislative session. However, the State Highway Department will have between three and four million dollars per year for the next two years for state road construction. This money is derived from a tax of 2 cents per gallon on gasoline, increased truck, bus, tractor and trailer privilege taxes and one-half of all passenger automobile license fees collected and in addition the Federal aid allowance, which amounts to \$1,400,000.

#### LEGISLATION—PRESENT AND FUTURE

Under the existing state law, an annual tax must be paid on each bus, amounting to 50 cents per engine-horsepower, as rated by the so-called S.A.E. (A.L.A.M.) formula, plus \$5 for each ton carrying capacity (factory rating). Private automobiles pay only the 50 cents per rated horsepower.

This tax is collected through the State Highway Commission, which retains half of the money collected

## Statistical Information Concerning Motor Bus Operations in Tennessee as of April 15, 1923

(c) On late Saturday night trips the fare is 75 cents. *City* operation ceased temporarily.

for use in construction and maintenance of state roads; the remainder is distributed equally among the various counties of the state.

The auto privilege tax, as it is called, for the right to use trucks, buses, tractors and trailers for revenue purposes was amended at the 1923 legislative session. The amendment provides a tax over and above the fee of 50 cents per rated horsepower. Motor buses in addition to this state privilege tax pay also a fee of \$30 per annum per bus in each county through which the bus operates, according to a bill that has just become a law.

Weights and speeds for heavy-duty vehicles are specified in traffic rules adopted by the commission. The maximum gross load on any one

Tennessee Transportation Facts	
Population of state .....	2,337,885
Area, square miles .....	41,687
Cities with population:	
100,000 or over .....	2
50,000 to 100,000 .....	2
25,000 to 50,000 .....	9
5,000 to 25,000 .....	10
2,500 to 5,000 .....	33
Total .....	47
Largest city, Memphis, population ..	161,351
Rural highways, improved, miles ..	8,880
Rural highways, unimproved, miles ..	37,170
Rural highways, total, miles .....	46,050
Number of bus routes .....	90
Number of vehicles .....	180
Inclosed buses .....	123
Touring cars .....	57
Miles of bus routes .....	2,400
Miles of electric railways .....	438
Miles of steam railroads .....	4,076

quires the use of mirrors on all buses and trucks, on penalty of fine of \$5 or more.

At present there is no legislation controlling the operation of buses, other than the state license, and the

Remine bill thus outlined was fought by the bus operators, and was killed in the Legislature.

The bill providing that passenger-for-hire vehicles shall be taxed \$4 if of two-passenger capacity, \$10 for five passengers, \$14 for seven passengers, and \$2 per seat when the bus is of more than seven-passenger capacity was also killed. This tax would have been in addition to the present license fee paid by all automobile owners.

#### LOCAL REGULATIONS

In the city of Nashville for-hire vehicles under 35 hp. pay a privilege tax of \$10 a year; if they are more than 35 hp., the tax is \$20 a year.

In addition all owners of automobiles for hire and taxicabs are required to file a liability insurance policy with the city clerk and drivers must be licensed. This city ordinance was passed in 1921 but an injunction was granted temporarily by chancery court restraining its enforcement. Recently the State Supreme Court handed down a decision declaring the ordinance valid.

Many of the counties charge a wheel tax, the amount of which varies with the locality. In Davidson County (Nashville) it is \$20 a year for vehicles carrying twelve passengers or less, and \$30 for larger vehicles. On payment of this tax, for-hire vehicles are exempt from an oil tax, required of pleasure automobiles, and used for the construction and oiling of Davidson County roads.

The status of bus operation in Tennessee is shown by the plans to establish terminals or waiting rooms in such cities as Memphis and Knoxville. In addition to bus connections with other places in Tennessee, Memphis has lines running into Arkansas and Mississippi. In Knoxville several meetings have been held, at which operators and business men have discussed the financing of a terminal to handle both passenger and parcel service. A terminal built in a convenient part of the city, with space to park the buses, would cost about \$100,000, it is estimated. Such a structure might include stores for accessory and tire dealers, and also a restaurant and other concessions, partly to meet the cost of operation. It is understood the Knoxville Chamber of Commerce and other civic organizations are backing the terminal movement, on the ground that it would be highly beneficial to local business.



*A fourteen-passenger Reo Speedwagon with cross-seats*

wheel is limited to 650 lb. per inch width of tire. Maximum gross load is 10 tons. Speed limits vary according to the gross weight of the vehicle; under 2 tons it is 20 m.p.h.; from 2 to 6 tons gross load the maximum speed is 15 m.p.h.; and for 6 to 10 tons 12 m.p.h. is the limit. All these provisions may be enforced by maintenance patrolmen, who are given police authority to do so.

The first result of the present legislative activity is a tax on gasoline. The law was passed in March of this year, and took effect the first of April. It levies 2 cents on each gallon of gasoline or distillate sold in the state. The proceeds are to be used solely for the construction and maintenance of the state highway system.

Another law recently passed re-

quires the use of mirrors on all buses and trucks, on penalty of fine of \$5 or more. At present there is no legislation controlling the operation of buses, other than the state license, and the

Remine bill thus outlined was fought by the bus operators, and was killed in the Legislature. The bill providing that passenger-for-hire vehicles shall be taxed \$4 if of two-passenger capacity, \$10 for five passengers, \$14 for seven passengers, and \$2 per seat when the bus is of more than seven-passenger capacity was also killed. This tax would have been in addition to the present license fee paid by all automobile owners.

# Automotive History Made at S.A.E. Cleveland Meeting

Transportation Meeting on April 26-28 Attended by  
Representatives of the Automotive Industry, Oper-  
ators of Motor Buses, Elec-

tric Railways and Steam  
Railroads, Who Discuss the  
Requirements of a Profit-  
able Organization That  
Would Give Satisfactory  
Service to the Public

**H**ISTORY was made in Cleveland on April 26-28 at the first automotive transportation meeting of the Society of Automotive Engineers. At this meeting representatives of the automotive industry, operators of motor buses, electric railways and steam railroads joined in discussing the requirements of an organization that could give satisfactory service to the public at a profit to the operators.

At one of the liveliest sessions the passenger-carrying motor bus was the only subject considered. A paper presented by C. D. Emmons, president of the United Railways & Electric Company, Baltimore, Md., which is abstracted on the following page, brought out timely comments from several engineers and operators.

In opening the discussion President H. W. Alden said that the fundamental error in the present system of transportation was that capital insisted it must earn a return on the investment in all outlying sections where really the community should provide the transportation. He mentioned a scheme to scatter business centers and the people throughout a city and stated that a plan of this kind is now being worked out in Detroit.

R. E. Fielder, Fifth Avenue Coach Company, New York, predicted that the taxation problem had been solved fairly to all classes of service. He took exception to the statement of Mr. Emmons in his paper that in Bridgeport and Des Moines bus operation was inefficient. In a few years, he argued, the bus would be on a par with both electric and steam railroad systems.

F. C. Horner, General Motors Company, urged greater vision in solving the urban transportation problem, saying that the best facility, with safety and comfort, would be used in the end.

Ralph W. Sanborn, secretary Cleveland-Akron Bus Company, could not agree that the electric lines were co-operating. At least many in

Ohio do not. Further, it was not his idea of co-ordination to have the pioneers in bus transportation ruled out when the electric lines saw fit to operate buses. Neither did he believe in fare competition, as the bus should attract a distinct traffic and at higher rates. He cited a case in Ohio where the automobile owners gave up the use of their private cars to ride on a newly established bus line. The main problems, he said, that were confronting the bus industry today were organization and financing. The electric railways, he pointed out, have the better organizations to draw on. The stabilizing law relating to bus operations which has just been passed in Ohio will materially help the financing problem. There was a danger, though, that buses operated by the electric lines would have to carry the charges of the abandoned rail lines, so it is cheaper in the end for the bus to be run independently.

In closing the discussion Mr. Emmons said it was foolish to think he favored pushing the small owner off the map so as to put in rails. He implied, though, that the independent bus operator should not be barred when the railway did not furnish needed bus service and cited Baltimore as an example where the state commission had insisted on the railway giving bus service and the railway had complied.

At other sessions the bus was spotlighted frequently. Rear axle tests conducted for the Army Motor Transport Service were described by an engineer from the Bureau of Standards. These tests showed at heavy loads that the gear type axles

with double and triple reduction were more efficient than the military design of worm axle, but the efficiency of the latter could be materially improved by better circulation of the lubricant. A good bus axle is not necessarily the best for military service where a high torque at low speed with good road clearance is essential and noise is not objectionable.

A plan for the national co-ordination of motor trucks with rail services was presented in a paper by Major Brainerd Taylor, in which he suggested a nationwide network of truck haulers under a centralized dispatching and maintenance control system.

In discussing this paper Lieutenant-Col. E. S. Stayer, head of the Army Motor Transport Service, said unit overhauls and replacements were essential for economical operation. Frames and springs, he pointed out, do not break often, but engines and rear ends must be replaced easily.

"What's Right with the Motor Truck Industry" was the subject of a paper by Stephen G. Thompson, consulting engineer for the White Company. He showed that the motor truck industry had progressed as rapidly as the passenger car and that the truck produced exceeds in durability and service that of the passenger car. Both the bus and truck supply the demand for new and better expansion in transportation that can adapt itself to changing conditions and is in a large measure unrestricted in its direction of operation.

David Beecroft, Class Journal Company, New York, agreed that the industry was fundamentally right and that the greatest need of development was the personal element and better organization of operators.

At the taxicab session two papers were presented. That by Hugh A. Bersie is abstracted on page 239. Paul H. Geyser, Yellow Cab Company, Chicago, in a paper on construction, maintenance and opera-

tion, told how vehicles had been developed to eliminate everything that tended to lessen their earning power by getting out of order, while at the same time including features for passenger comfort and safety. The present taxicabs are designed to operate 60,000 miles per year and to give 300,000 miles of ultimate service. The power plant has an L head engine and detachable cylinders for quick valve repairs, fixed hub rear axles, with all the load thrusts taken in bearings, and a carbon steel frame, to stand straightening. Electrical equipment includes a lighting battery, but no starter or generator or electrical horn. The muffler is made of sectional stampings, while the radiator is of the tubular type with replaceable units. It has outside brakes,  $2\frac{1}{2} \times 15\frac{1}{2}$ , that are good for 15,000 miles. All told the taxicab is built to stand service.

## Co-ordinating Motor Bus and Electric Railway\*

By C. D. EMMONS

President, United Railways & Electric Company, Baltimore, Md.

IT IS well recognized that no form of transportation has yet been devised that can take the place of the railroads for long-distance travel, in speed and comfort, and that of the electric railways for mass transportation. They unquestionably carry the greatest quantities of goods and the largest numbers of people at the lowest cost. Whatever new forms of transportation may be developed, with the possible exception of vehicles navigating the air, must be auxiliaries to the rail lines. I do not say this because of any prejudice favorable to railroads and the electric railways, but because this finding is a fact that has been amply demonstrated.

The problem before everybody interested in transportation, therefore, is to bring about co-ordination between the railroads and railways on the one hand, and all other forms of transportation on the other. At this time we can leave out of consideration airplanes and airships, steamboats and canal transport, and concentrate our attention upon co-ordinating motor-bus and motor-truck service with rail service.

There is no conflict between the electric railways and the motor-vehicle industry. Instead, there is the heartiest co-operation. There are many electric railways in the United States that are using motor vehicles in connection with their transportation service. On the other hand, there are many railways that are suffering from parasitic competition from unregulated motor vehicles. These railways serve com-

munities that have not yet learned that these two forms of transportation cannot operate in competition with each other without one or the other going broke.

It is for the people themselves to decide whether they wish to keep the railways or the motor vehicles. I think all sensible men will say that if the motor vehicle will serve a community better and at a lower rate of fare than can be offered by an electric railway, then by all means junk the railway. The fact, however, is that except in small communities the railway is much cheaper to operate than the motor vehicle.

### MOTOR VEHICLES AS COMMON CARRIERS

It almost universally develops that when the motor-vehicle common-carrier is subjected to the same burdens of taxation and to the same regulations that apply to the electric railways, they find it impossible to operate successfully. Electric railways in many states are required to carry extraneous burdens. They have to pay for the paving between the rails and for a distance outside their rails; they have to pay for watering streets, for snow removal; they pay a percentage of their gross income, whether they have any net income or not, in taxes to the state; they pay in many communities a tax on their income to the community; they pay franchise taxes, license fees and other charges that put a heavy load upon them.

The motor vehicle that is competing with them, in many communities, has free use of the paving for which the electric railway pays. In many states motor vehicles have not yet been classified as common carriers; there is no regulation of the rates of fare or charges for carrying freight; in many places they are not under bond, so that if a passenger becomes involved in an accident he has but slight chance to recover damages. They do not pay a percentage of their gross income to the state or communities; they do not have to help water the streets. Put upon the motor vehicle the same burden that the railway carries and fares that will permit successful operation, then competition with the railways becomes out of the question.

The automotive industry must realize that it cannot foster a service that engages in ruinous competition with rail lines, whether they be steam or electric. I venture to say that there are not enough motor trucks in the United States to bring to your automobile factories the raw materials that are necessary for the construction of motor vehicles. Nor are there streets wide enough, nor automobiles enough in any community, to carry the employees of your factories to and from work as expeditiously and cheaply as they are carried by the electric cars. For example, a recent traffic survey in the city of Baltimore, Md., of the travel into and out of the business area showed that, while the automobile comprised 73 per

cent of the total movements and the street cars only 27 per cent, the street cars actually accommodated almost 89 per cent of the total travel, while the automobile only accommodated about 11 per cent, disregarding the very small percentage of horse-drawn vehicles.

### MOTOR-VEHICLE OPERATION

There is a committee of the American Electric Railway Transportation and Traffic Association that devotes its entire time to the study of motor-vehicle operation. It is made up of men who have spent practically their entire lives in the transportation business. They know what is necessary in any vehicle for economical and satisfactory transportation. The assistance that this committee can render and will render the men who are designing vehicles and engines will be very great.

The transportation industry no longer will take any old kind of bus body put upon a standard truck chassis. The vehicle must be designed for the kind of service in which it is to be used, and we have found the motor-vehicle builders willing to adopt suggestions that we have made.

It is in this field especially, it seems to me, that the Society of Automotive Engineers comes into play. Its members should be the ones to solve the needs from a design standpoint of automotive vehicles. The operating men, who are handling the public, are, in general, the ones best able to say what is needed to furnish to the public the most satisfactory character of vehicle for transportation, and it is the duty of the engineers to incorporate these needs into actual designs.

The question of light weight and economical operation are of particular importance from the standpoint of the financial returns to the operator. In connection with the need for lightness, there is not only less cost of operation and maintenance, but it lessens the wear on the roads and, in a number of cases, because of the tax laws on the books, there is a particular demand for light-weight vehicles. In Maryland, for instance, there is a tax of  $\frac{1}{3}$  cent per seat-mile for vehicles weighing more than 8,500 lb.; the tax between 7,000 and 8,500 lb. being  $\frac{1}{15}$  cent per seat-mile, and you can easily imagine why we want a light automotive vehicle in Maryland, when there is an increase of almost 200 per cent in the tax basis the minute you go over 8,500 lb.

### COMFORT OF PASSENGERS A NECESSARY FACTOR IN DESIGN

The comfort and convenience of passengers is a necessary factor in design. The appearance of the car is another thing that has a marked effect on public sentiment and involves, of course, in addition to the initial design, proper upkeep. Convenience in handling by driver and easy riding qualities making for comfort are of great importance. The design of automotive vehicles with reference to safety is another side that must always be kept in mind; adequate

\*Abstract of paper presented at Transportation Meeting, Society of Automotive Engineers, held April 26-28 at Cleveland, Ohio.



lighting; ease and rapidity of acceleration; low steps and additional details of construction, all of which bear upon the financial return to be expected; the comfort of passengers and the public-relation side of operation, which last is most important. You will see, therefore, that the automotive engineers need to co-operate most closely with the operators in order that the most satisfactory type of automotive vehicle may be evolved.

#### BUSES AS RAILWAY AUXILIARIES

The development of a motor bus that can be operated at the minimum of expense will make it easier for people living some distance from a rail line to get transportation, although at a higher price than is charged for rail service. By extending motor bus lines from the termini of rail lines or from other points into sparsely settled territory, railways are enabled to serve sections that could not hope for rail service for many years to come. When the railway does this, the people are assured of a permanent service and property owners are encouraged to build homes. As the district grows, the time comes when service can be given more cheaply by the railway, and then the railway company is justified in extending its rail lines into districts that have been built up by motor buses, transferring the buses to still more remote sections.

When such territory is served by individuals or unregulated drivers, the community has no assurance that the service will be permanent. A fly-by-night jitney driver may be able to serve a community for a limited time at a low fare, but his day is short and, when it is done, the people find themselves marooned unless the railway company, with its years of experience, comes to their rescue.

Let me say in closing that the prosperity, comfort, convenience and intellectual growth of the people depend primarily upon the establishment and maintenance of a transportation service that is reliable, permanent and efficiently conducted. There has not yet been developed any transportation service of this character, except that of the steam railroads and the electric railways. As a representative of the electric railway industry I want to say that my industry recognizes the great service that can be rendered through the use of motor vehicles, and that it is using them and will use more of them in the future; but further, that any policy of competition which unwise automobile advocates may adopt is certain to be ruinous to themselves and to the railways, whether they be steam or electric; and once a railway stops operating it is an extremely difficult matter to restore the service.

I trust that I have made clear to you in this discussion the fact that if your great industry and the electric railway industry will co-operate, far greater benefit will flow not only to us, but, what is more important, to the public that we serve.

## Taxicab Body Construction\*

BY HUGH G. BERSIE  
Advertising Manager  
Heskette Manufacturing Corporation  
Chicago, Ill.

ON JAN. 1, 1922, there were 75,000 taxicabs operating in the United States, an increase of 16 per cent as compared with Jan. 1, 1921. It is estimated that on Jan. 1, 1923, at least 110,000 cabs were in service. This phenomenal growth, which occurred in spite of business depression, has led a number of automobile companies to enter the taxicab field. Compared to the passenger car industry, the efforts necessary in the sale of taxicabs are very small. The number of cabs that can be sold is limited at present to the production facilities of the companies engaged in their construction.

The efforts of many passenger car builders have been directed along the line of producing an inexpensive light weight closed car. The taxicab, on the other hand, must be durable and so well built as to run approximately 27,000 miles per year as compared with the passenger car average of about 3,000 miles. Taxicab service demands not only the maximum durability in the body, the engine and the chassis, but also provision for the satisfactory and easy replacement of any worn or damaged parts, a factor often overlooked. The plan of this paper is to suggest a means of attaining these ends in body construction.

#### METHODS OF SECURING DURABILITY

We shall begin with the body framework, because the quality of the whole job is reflected in this one item more than in any other.

First, heavy sills are very desirable. They are about 50 per cent heavier than in passenger car bodies of the same size. The numerous "gunstocks," as well as the paneled roof, reinforce the frame members. That part of the sill which is over the wheelhousing can be reinforced by an iron strap applied to the side of the sill. Bent or formed sills are rarely if ever used; it is customary to build up the sills by screwing and gluing several pieces together to secure the required shape. Tests indicate that the four-piece construction is most desirable.

The door pillars and door frames are next in importance. Since the doors themselves must be exceptionally heavy so as to prevent warping, it follows also that their pillars must be correspondingly heavy. The rear pillars may be about 2 in. thick and should at no point have deep mortises or cut-outs that would weaken them at these places.

#### WOODS FOR FRAMEWORK

Mountain or white ash is the best wood for frame members as it has better strength and screw-holding properties. Yellow ash, which is some-

\*Abstract of paper presented at Transportation Meeting, Society of Automotive Engineers, held April 26-28, at Cleveland, Ohio.

times substituted, is inferior in these respects. Poplar is used for arm rests and parts subsequently upholstered.

The quality of a job is judged largely by the joints. Modern woodworking machinery has been developed to make joint forming almost automatic, but there is still the need of the careful conscientious workman to select members that have been improperly formed.

Door hardware has been the object of much study, especially the hinges, which are now almost invariably of the curved joint pattern.

#### ROOF CONSTRUCTION

Taxicab roofs are designed and constructed far differently than for passenger cars. The panel roof is in universal favor with taxicab builders and, when properly constructed and installed, gives excellent service in all closed cars. The trouble that was formerly experienced with draining of vibration has been practically eliminated by proper methods of installation. At present, all large quantity car builders use plywood molded roofs.

#### CONSTRUCTION OF PLYWOOD ROOF

Practically all of the roofs are of the three-ply construction, 1 or 1½ in. thick. Upon receiving these panels from the manufacturer, the body builder bandsaws them to shape from a template and then clamps and glues the panels to the roof rail or the frame at all edges.

After the shaping process the entire roof is covered either with glazed duck or with plain sheeting. The glazed duck is already finished, and need not be glued to the roof. However, the sheeting is easily glued to the roof panel and is inexpensive, except that it requires a fairly good paint finish. A roof so constructed is light and durable, and affords a reliable watershed. In case the cloth covering is torn or ruptured, and this is unlikely because the roof panel itself takes all the stresses, the panel itself will shed water; this saves the upholstering and the interior furnishings of the car until such time as the roof covering can be repaired.

This last point brings us to a consideration of the grade of plywood that is satisfactory for roof panels. The plywood bonded by animal glue is not suitable. Extensive experience has shown that much. The waterproof plywood is recognized as the standard for roofs.

#### DASH AND INSTRUMENT BOARD

In like manner, the waterproof panel of highest grade has found wide favor for dashes. It fills most of the needs of the dash, and a dash has many functions. It should act as a heat barrier, should deaden sound or vibration and act as a structural part of the body. The steel dash fails on several counts; it tends to rust, the bolt fastenings work loose and it is difficult to remove and replace if spot-welded in place. This point of replacement must be considered at all times in taxicab body construction, as contrasted with passenger car design.

# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, May, 1923

## *Why Pick on the Automobile?*

**A** DOUBLED tax on gasoline and a 50 per cent increase in license fees for all automobiles is proposed by the Pennsylvania Legislature as a means of meeting a \$20,000,000 deficit in the funds available for general educational purposes.

Assuming, what is by no means conceded by all members of the Pennsylvania Legislature, that the state machinery is operating without undue waste and that the additional revenue is actually needed, there arises the question as to why automobile owners should be singled out to meet the deficit.

The automobile has long since passed out of the luxury class. Possession of a motor car is no longer necessarily a sign of wealth. As a matter of fact, the necessary acquisition, operation and maintenance of these vehicles is a severe drain on many an income. Obviously automobile owners cannot fairly be singled out as the class of taxpayers whose resources mark them as pre-eminently fitted to meet the state deficit for educational purposes. Neither can automobile owners be singled out as the class which more than any other will be benefited by the state's educational work.

Already the owner of an automobile is paying his full share of specific taxes, such as the federal sales tax, the state license fees, the gasoline tax, drivers' fees and in some states still other specific charges. It should be easy to see that this class of citizens is already doing its full share toward paying its own way and its part of the general burden. Apparently nobody has set up the claim that the deficit is specially attributable to the automobile owner, the present administration being practically unanimous in blaming its predecessors. Nobody can logically find fault with the principle of expecting the automobile owner to help meet state expenses which he is instrumental in creating, nor does the car owner object to specific assessments for such purposes. But there is little if any logic for this taxation to meet general requirements. By all means let the state do whatever is necessary to maintain and if possible to improve its schools, but let the cost be distributed among all who will be benefited; that means among all taxpayers. This may not be good politics, but it is, at least, just.

There is no more sense in levying this additional tax on the automobile than there would be in picking on the butcher, the baker or the candlestick maker.

—[ EDITORIAL ]—

## *In Union There Is Strength*

**T**HE rapid development of the voluntary bus associations composed of individuals who own one, two or three buses has been a feature of recent bus history. These associations have appeared in many of the more important bus centers, primarily to insure better service to the public as well as for the general protection of motor bus interests.

These associations are undoubtedly, in fact they must be, the forerunners of more stable organizations. Either they will develop into holding companies for maintenance and purchasing purposes, or into incorporated companies, with the equity of the individual owners proportioned on some basis according to the value of their equipment. These companies then will carry on all the work of operating transportation organizations.

Already in Bridgeport, Conn., the owners have turned their interests over to a corporation of which they are the stockholders, directors and officers. They were, undoubtedly, inspired to take this action by the State Utility Commission, which desired to deal with but one responsible party for each route rather than with each individual owner-operator.

There are, however, many reasons for owner-operators joining hands when they run over the same line. It puts an end to jealousies and hard feelings, it gives every operator a fair show whether business is good or bad, and it gives better service to the public, which is the only way in which money can be made for all. Another important benefit is in the better financial position of the owners thus linked together. The finance companies which have handled bus paper in the past, and the new ones now being formed to specialize bus financing, are both keenly alive to the value of strong business organizations.

—[ EDITORIAL ]—

## *Engineering in Bus Operation*

**E**LSEWHERE in this issue appears an article describing the standards work of the Society of Automotive Engineers. For the benefit of the readers of *BUS TRANSPORTATION*, the general manager of the society shows how it already has helped the great body of automobile users and indicates that in the future it will also assist the great body of users represented by bus operators.

The S. A. E., one of the most productive workers in the field of practical engineering standardization, is thus beginning to appreciate the importance of the bus as a distinctive form of automotive construction. This in itself is full of meaning for bus men who look forward to the wonderful future of this new form of mass transportation.

As Mr. Clarkson points out, bus operators are already getting the benefit of S.A.E. standards. The magneto mounting dimensions and the car-

buretor flanges, which permit the installation of any make of these devices on any bus engine, are widely used examples of S.A.E. standardization. It must be recognized however, that certain standards adopted by the society will not do at all for buses. Take the location of engine number, which is intended to identify the vehicle as well. This would not be of much use to the bus operator who shifts a given engine from one vehicle to another, or takes it out from one bus, overhauls it and then puts it in stock. There is no doubt that the bus is a peculiar animal, one that requires special treatment, even by the engineer.

But the society is doing something more than standardize details of construction. It is promoting the use of engineering brains and methods in the operation and maintenance of all types of automotive vehicles. In this broader field of society activities bus operators have much to give and much to receive. The very nature of their business requires the constant use of the highest type of engineering skill, not only in maintenance work, but too often in rebuilding present equipment. For this an engineering degree or diploma is not at all necessary, although there are many bus operators thus qualified. The knowledge that comes from the operation of a successful bus system is after all the real test and evidence of engineering ability. It is also the best guide to the building of better buses. All this the operator can give to the designing engineers in the society.

In return he is already getting much from the society, since maintenance and operation are being discussed more and more at the S.A.E. meetings. Only recently at one of these meetings a leading operator of motor trucks suggested that the society work out a standard method of keeping costs and also a form that operators could use to record the mechanical condition of their vehicles. Since both of these represent an improvement on existing practices, they should be useful to bus men.

— EDITORIAL —

### *Help Keep Up the Highways*

**I**T DOES NOT take a pencil and pad and a lot of complicated figuring to show bus operators the value of good highways. All of them know it, and some of them know, much to their regret, the expense involved when the highways are not good or are not properly maintained.

Tire mileage, fuel economy measured in miles obtained for each gallon, and general maintenance costs are all controlled to a great extent by the highways.

As a user of the highway, the bus operator is entitled to the maximum service the roads can give. There are several ways in which he can work to secure this maximum service.

The first is to report any bad spots, broken pavement, or chuck holes, to the proper authorities, whether they be the local highway patrol, district highway engineer, city or town street departments, or to the state highway authorities themselves.

All these people are the servants of highway users, and when given a statement of the troubles

and their exact location, they are at a rule willing to remedy them at the earliest possible moment. Only in unusual circumstances should it be necessary to go over their heads to the police and take matters up with the legislature, or city council, and other bodies which should represent bus operators as well as other users of the public highway.

The bus operator should also cooperate with automobile clubs, tourists' bureaus, business men's associations, and others who are vitally concerned not only with the building of good highways but also in keeping them in good shape afterward.

A stitch in time saves nine. For their own good bus operators should insist upon all reasonable steps being taken to keep the highways in good condition.

— EDITORIAL —

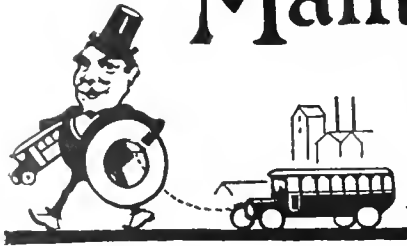
### *The Open Air Ride*

**U**NQUESTIONABLY the public likes to ride, and likes to ride out in the open air, especially in good old summer time. The popularity of the upper seats on double-deck buses and the crowds which patronize the big sight-seeing and beach-bound buses attest to this condition.

Well do we remember the time, a little over two decades ago, when the good and thrifty mother of the little family used to take her children for an evening's ride in the big cross-bench open trolley cars that the trolley companies of those days were wont to run. For a few nickels, the entire family enjoyed two or three hours joy riding and came home tired but happy. Then in the interest of economy, so the public were told, those grand old open cars that had so many friends and tender memories were consigned to the scrap heap, or converted to the all-inclosed type of car. Of course, there were some who felt sorry for the poor railway company, but the fact remains nevertheless that the heretofore joy riding passengers didn't care so much about riding when it had to be done on closed cars. The one result was inevitable. They confined their patronage to necessary and unavoidable trips.

With the advent of the automobile the dormant desire to again joy ride out in the open has been re-created. This is manifest any day at any time in almost any part of the country. There are still many of our populace who have not yet arrived at that state of affluence where they feel they can support a private automobile or if ever in the state to which they are accustomed. They are benched up, however, with the hope that some of the more enterprising motor bus operators may see the new way clear to offer what they want, a ride out in the open.

As yet the evening coaching party is unknown, but who can tell what the summer of 1923 will develop. It is not unreasonable for some enterprising bus operator or operators to get together and during the pleasant summer evenings make it again possible for mother to go out to the corner with her kiddies dressed in the freshly laundered gingham and hail a passing bus for an old-fashioned joy ride at a moderate price. Who is going to do it, and how? No one professes to know, but it is hoped that some one will have the initiative to take up this suggestion and see what can be done.



# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Massachusetts Firm Produces Bus Design

WACHUSETT MOTORS, INC., Fitchburg, Mass., is making various models of buses, of sixteen to forty passenger seating capacity, on three sizes of chassis. The model K design, shown in the illustration, takes a twenty-five-passenger body, measuring 213 in. from dash to rear end. The head room is 74 in. and there are two step risers, 14 in. and 8 in., so that the forward entrance is 30 in. from the ground. The service door and main aisle are each 24 in. wide.

The equipment inside includes eight dome lamps, each 6 volt, 21 cp.;

### Braking on All Four Wheels

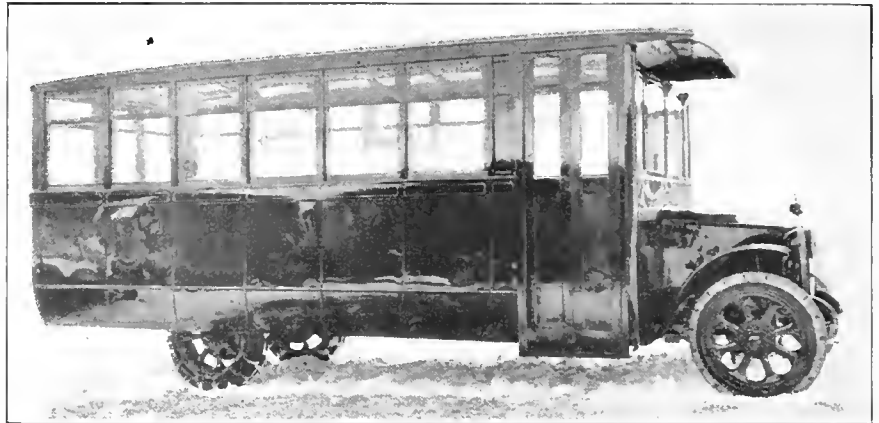
A FRONT axle design, fitted with brakes and arranged for connection to the rear axle brake control, has been brought out by the U. S. Axle Company, Pottstown, Pa. The front brakes can be equalized with those of the rear wheels by a rod or cable connection, or they can be hooked up with a brake mounted on the transmission.

The front braking mechanism consists of a lever, *A*, keyed to a push rod, *B*, the former being hooked up to the brake pedal. When this pedal is pushed down the lever moves in the direction to the rear of the axle, thus turning the push rod. The threaded ends of the rod *C* then move toward the front wheels; the cam *D* is pressed down, thus forcing the lever *E* against the yoke *F* and the long toggle *G*, the latter acting directly on the brakeshoes. The brake toggles are of unequal length and are offset from the center of the pivot. This construction, it is said, prevents chattering, because the shoe that tends to wrap into the drum is subjected to a lighter pressure than the one that tends to push away from it. The rotation is as shown by the arrow in the drawing of the brake mechanism.

Brackets mounted on the side of

the I-beam axle carry the one-piece push rod, which can move lengthwise so that the braking pressure is equalized. The lower part of the cam *D* floats in the push-rod ends, so no binding is caused by beam deflection.

Since the toggle mechanism is con-



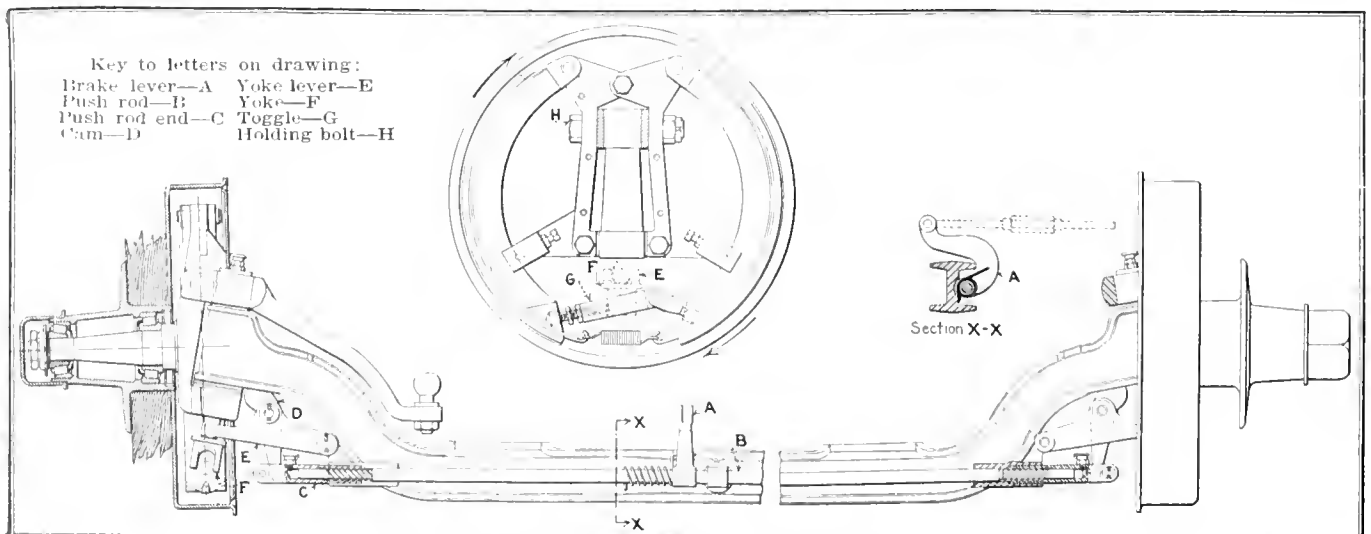
Wachusett bus with cushion wheels and notched type tires

trolled by a yoke, the shoes are free to move, as is also the toggle, and thus the shoes are self-centering.

One bolt, *H*, holds the brake anchor and the steering arm in position, but there is no direct stress on this one bolt through either part. In addition the brake mechanism is covered in a neat and compact manner.

a Petry heating system using 1½-in. pipe, and four Cowles ventilators, located at the front and rear. The complete job (chassis and body) weighs only 7,200 lb. and has a 176-in. wheelbase with 58½-in. gage front and rear.

Chassis units include a Continental 4½ x 5½-in. engine, Stewart



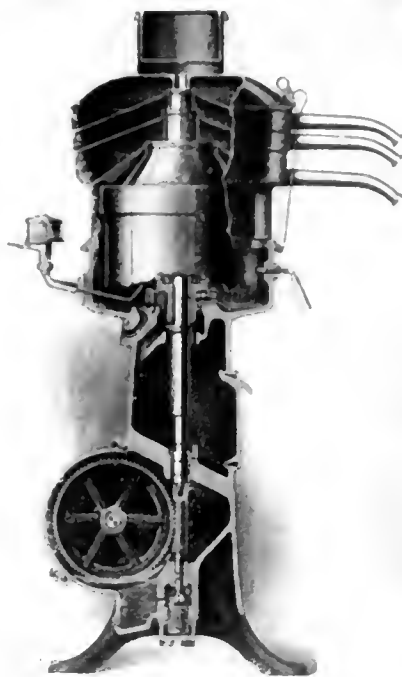
Arrangement of front wheel brakes

vacuum feed, Zenith carburetor, G. & O. radiator, Bosch electrical equipment (ignition, starting motor and lighting generator), and Exide 110 amp.-hr. battery. Brown-Lipe clutch and four speed transmission are used, and Timken front and rear axles. The wheels are Smith cushion make, with 36 x 4-in. tires on front, and 36 x 8 on rear.

### Method for Reclaiming Crankcase Oil

THE accompanying illustration represents a belt driven oil purifier made by the De Laval Separator Company, New York, N. Y. This company has developed a process for purifying crankcase oil containing gasoline in addition to water and other impurities. In addition to the purifier two tanks are required for the process; first, a tank into which the dirty oil is pumped and live steam blown. The water is then drained off and the heated oil sent through the oil purifier and into a second tank. From the second tank

throws off the remaining traces of impurities and water. These are forced along the lower surface of each disk toward a sediment pocket, from which they can be discharged, while the pure oil is forced toward the center shaft and from there upward through an oil discharge outlet.



*Sectional view of De Laval belt-driven oil purifier. Center pipe, on the right, discharges purified oil; others are for overflow and waste.*

### New Type of Low Hung Bus Chassis

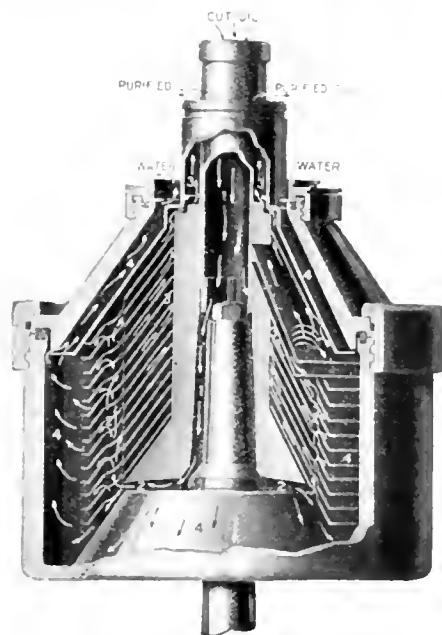
THE Day-Elder Motors Corporation, Newark, N. J., announces a thirty-passenger bus chassis, with 192 in. wheelbase. The height to top of frame from the ground is 23 in. at the front, and 24½ in. at the rear, of the loaded chassis.

Complete electrical equipment is supplied, including a Bosch 4-in. generator, Bosch 4-in. starting motor, and Eiseman high-tension magneto. As shown in the illustration, helper springs are mounted to assist the main rear springs. These are the same length as the main springs but are mounted above them on each side, so as to come into play in absorbing the rebound.

The engine is a Continental six-cylinder type, 3 x 5½ in. bore and stroke, giving 12 b.-hp. at 1,200 r.p.m.; Shuler front axle of 68 in. gage is used; Timken worm-drive rear axle, with 74 in. gage, and double internal expanding brakes. Fuel is supplied from a 20-gal. gasoline tank mounted under the driver's seat.

The drive is through a Brown-Lipe multiple-disk clutch, a four-speed transmission of the same make with direct drive on high, and a tubular propeller shaft with three 8-in. flexible disks. The shaft is supported at the center, on a cross member of the frame, in a self-aligning double-row ball bearing. Metal wheels, 36x6 pneumatic tires front, and 36x6 dual rear, are standard equipment.

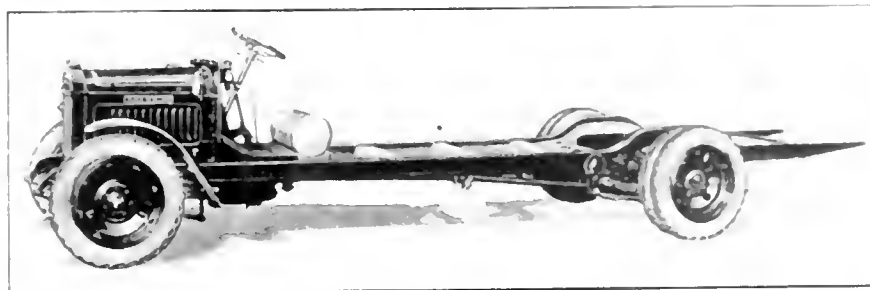
The chassis complete, without body, weighs about 6,000 lb. and is capable of a speed of 35 m.p.h.



*Cut-open view of De Laval oil purifier, showing disks through which oil is forced*

the clean oil can be drawn off as required.

The purifiers come in different sizes and with different types of drives. The one shown is driven by belt, but an electric motor mounted on the purifier or a steam turbine can also be used. The capacity varies with the different sizes from 5 gal. per hour up to several hun-



*Day-Elder Model 30 bus chassis with frame up-swept 7½ in. at rear axle*



*Looking at rear of Fremont twenty-one-passenger coach mounted on Clydesdale bus chassis*

### Interurban Coach Seats Twenty-one Persons

THE Fremont Metal Body Company, Fremont, Ohio, has developed a twenty-one passenger body of the sedan type. As shown in the illustration, it is mounted on a bus chassis made by the Clydesdale Truck Company, Clyde, Ohio. The body has four doors on the right-hand side and two on the left, all 31 in. wide. Each door is mounted on four malleable-iron hinges, which can be attached either to the front or the rear. Locks are provided with double catches on all doors.

Interior equipment includes dome lights, buzzer plates, three Nichols-Lintern ventilators installed in the roof, and a three-rail baggage compartment over the rear of the body. A slat roof is used under the baggage-rail space, while the rest of the roof is of the padded type. In the rear is a trunk 25 in. high, 54 in. long and 18 in. wide, at the bottom, tapering to 14 in. at the top. This is covered with imitation leather to match the body and has a Corbin lock.

Inside, the cushions and backs are covered with heavy imitation leather, the ceiling and sides are in velvet imitation leather, and the interior finish may be either walnut or mahogany.

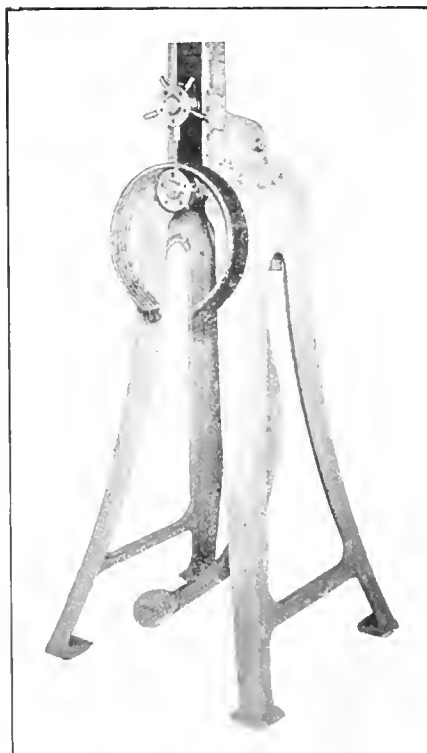
Body framing is ash and oak, covered with 20-gage metal on the sides. Height inside is 54 in. with a door height of 48 in. Outside width is 73 in. at bottom of windows.

The Clydesdale chassis has a six-cylinder engine, and is fitted with 32x6 pneumatic tires so arranged that duals can be used in the rear. The four-speed transmission is mounted on the engine, with a step-

up or over-gear on high speed. Chassis wheelbase is 198 in., and its height is 27 in. from the ground.

### Machine to Reline Brakes and Clutches

THE Service Station Equipment Company, Chicago, Ill., offers its universal brake relining machine, which it is said will reline all brakes and practically all fabric-faced clutch disks. Various types of rivets, such as solid, tubular or split, can be used in this device, which as sold includes the necessary chisels, punches, dies and anvils. The machine is operated by a foot lever so



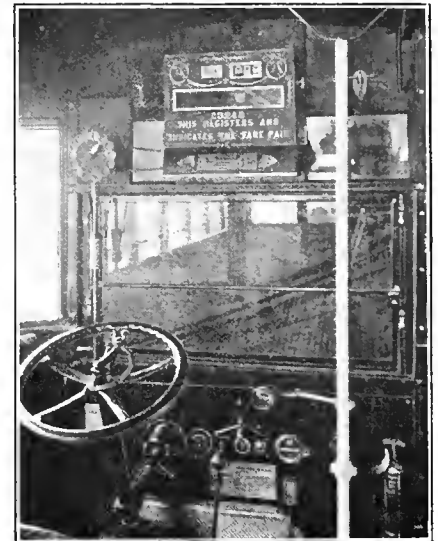
*Punching holes in brake band on relining machine*

that the workman can use both hands in adjusting and holding the lining and brake band.

The weight of the machine shown in the illustration is about 250 lb., its length 24 in., width 21 in. and height 55 in.

### Indicating and Recording Fare Register

THE Ohmer Fare Register Company, Dayton, Ohio, is now placing on the market a number of new recording registers designed for motor bus service. These retain the



*Ohmer installation in motor bus. Amounts of fare shown on register and on indicator*

features of Ohmer registers for electric railway operation, but have been made smaller to adapt them to the more limited space available in motor buses. The illustration shows an Ohmer indicating and recording fare register with a capacity of twelve different fare denominations. The registers are made in many different sizes and styles and with capacities for indicating and recording any variety of fare denominations.

The printed record obtained from an Ohmer fare register tells what drivers operated the bus, how many trips each driver made, how many fares of each kind each driver collected on each trip, the date, the number of the register, and other information depending upon the particular type used.

The registers are operated in a variety of ways. That shown has a vertical operating handle which is turned horizontally to indicate the fare desired, and is then given a gentle pull to complete the registration.



## Light for Driving and Repairs

THE Robert Bosch Magneto Company, Inc., New York, N. Y., has brought out the spotlight as shown in the illustration. This is fitted with a polished metal reflector for throwing the light ahead. Adjustments can be made in any direction by a double control; the lamp moves in the trunnions at the side and can be turned around by a pivot at the bottom.

A knob for directing the light and for switching the lamp in or out is



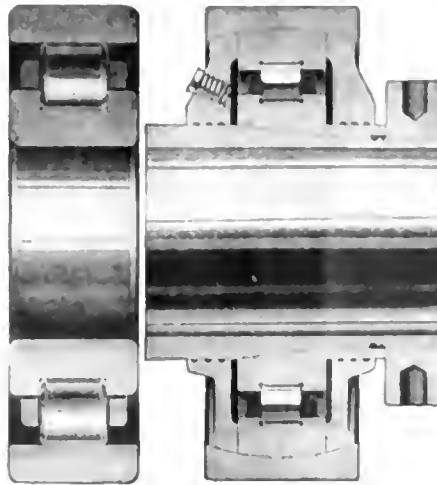
*Spotlight showing swiveling mechanism and switching knob*

placed at the back. The housing is in black varnish, with front ring and knob of polished aluminum. This light can be furnished for 6 or 12-volt circuits, with or without the driving mirror on the housing knob.

## English Roller Bearings Introduced in This Country

THE Norma Company of America, Long Island City, N. Y., announces that hereafter Hoffmann roller bearings in both standard and self-aligning types will be manufactured in this country, in a new plant built and equipped for the purpose. These bearings have been made for years by the Hoffmann Manufacturing Company, Ltd., Chelmsford, England. They are well known on the Continent, it is said, as a high-precision, heavy-duty unit combining the speed qualities of ball bearings with a load capacity beyond that of any ball bearing of equal dimensions.

The standard type Hoffmann bearing has an outer race or ring of plain cylindrical form, with rectangular cross-section. This gives a "flat-line" race-way on which the rollers run. The inner race or ring has a channel cross-section, with narrow



*At left, Hoffmann standard roller bearing. At right, Hoffmann self-aligning roller bearing*

rim on either side of the flat-line race-way to retain the roller endwise. The rollers, which are cylindrical with a length equal to their diameters, are held parallel with the shaft and with one another by these rims or shoulders. Because of this short roller and of the retainer construction, it is claimed that troubles experienced with types of roller bearings using taper rollers or long rollers of small diameter are eliminated.

While the bearing as thus described has no end-thrust capacity, this can be taken care of by thrust buttons at either end of the shaft, or, where the end thrust is large, by auxiliary ball bearings mounted between two roller bearings.

In addition to the standard type, which is rigidly mounted, the same general construction is followed in the Hoffmann self-aligning roller bearing, also illustrated. In this type the rim of the outer race and its two covers are ground to form one continuous spherical surface. This fits a similarly shaped inner surface on

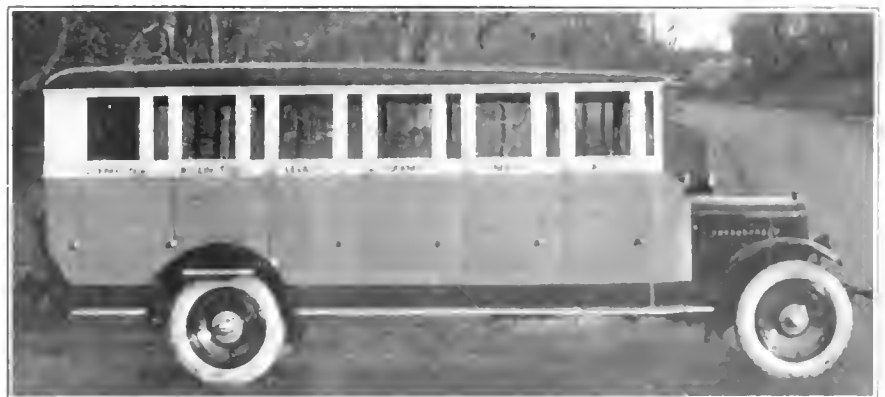
the shell or housing. The bearing is thus free to align itself with its opposite members, the dust covers following every movement. Thus, these covers can be bored with a small running clearance on the clamping sleeve, and it is said that lubricants cannot work out or dirt get into the bearing surfaces. In the type illustrated, the clamping sleeve extends through the dust covers so that the bearing can be mounted without exposing its working parts.

From this brief description and from the sectional illustrations given here, it will be seen that the Hoffmann roller bearings depart from established practice of design or construction. The main advantage claimed for them is the extreme precision to which they are built. This accuracy, it is said, is the result of special processes on special precision machine tools, checked at every stage to eliminate the "personal equation" of the mechanic.

## Sedan Type Body Seats Twenty-three

THE Hulek Manufacturing Company, Kansas City, Mo., offers the body shown in the accompanying illustration. This carries twenty-three passengers on cross seats. Sheet steel, 20 gage, covers the white oak framing. The roof is match-board with metal sides covered with Fabrikoid. Fittings include three dome lights, each of 21 c.p., a pipe heating system on the left-hand side of the body, and drop glass windows on both sides. The interior finish is natural wood throughout.

The body weighs about 1,800 lb., and is 17 ft. 7 in. long from dash to rear. At top of seat cushions the width is 66½ in., tapering down to 59 in. at the floor level. Service doors are 22½ in. wide.



*From Missouri—A twenty-three-passenger Hulek body mounted on G.M.C. chassis. Extra step above rear wheels gives access to seat on each axle.*

# Condensed Specifications of Motor Vehicles for Bus Service

Revised to May 1, 1923

Trade Name and Model	Capacity, Seats	Unloaded Weights, Lb.		Dimensions				Engine Detail				Electrical Equipment				Transmission		Axles		Wheels	Tires																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Chassis	Truck	Wheelbase	Tare, Front	Tare, Rear	Steering, H.P.	Normal Speed, M.P.H.	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Battery, Volts, Amp-Hr.	Starter	Generator	Clutch			Gearset	Front	Rear	Final Drive	Steering Gear	Springs	Trailing	Maker	Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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# What the Associations are doing



News and happenings of the associations. Proceedings of interest to the bus transportation industry.

## Fundamentals of Fleet Operation\*

Leading Operators and Engineers Discuss Selection and Maintenance of Motor Vehicle Equipment—Suggestions Made for S.A.E. Standardization

BY EDWARD LA SCHUM

General Superintendent Motor Vehicle Equipment,  
American Railway Express Company, New York

**T**HE business of the American Railway Express Company is transportation. In fact, transportation is its sole function.

Our total equipment throughout the United States and Canada consists of 2,636 gasoline vehicles, 1,195 electric street trucks, 324 electric industrial platform trucks and 100 semi-trailers and about 8,500 horse-drawn vehicles, which means a total of 12,755 units. Of these about 33½ per cent in numbers are motor vehicles, but this 33½ per cent carries over 50 per cent of our shipments. The horse-drawn vehicle averages approximately 12 miles per day, the electric vehicle 20 miles per day and the gasoline vehicle 30 miles per day.

On July 1, 1918, when all the express companies were merged, the new company found itself in control of fifty-nine different makes of motor vehicles and in these fifty-nine different makes there

were 131 different models. Out of 377 trucks manufactured by an old-line company we had twenty-one different models in which the parts were only in a small degree interchangeable.

We have recently bought trucks from an old-line company and after receiving the first lot changes were made without notice to us before we received the second lot, which was purchased a few months after the first, making it necessary for us to carry two radiators in our stock room where one should have been enough. In a fleet of eight old-line trucks, all delivered at the same time, there were three different makes of magnetos.

This great difference in models and in constructional units complicates our maintenance problem and adds much to its cost. It was necessary to keep away from complicated apparatus vastly different from standard or common practice.

The buyer of motor trucks should not criticize the engineers for what has gone before. It was necessary to work

out and improve, but since engineers are now able to produce a motor vehicle that will perform satisfactorily there is still further need to keep away from the hundreds of accessories.

I don't know how many spark plugs there are to be had, but I do know that there is only a slight difference, if any, in the intrinsic value, and that the operator who is continuously trying different ones is creating an unwarranted expense.

### NEW EQUIPMENT NEEDED

I have asked engineers to develop a mileage counter, but there seems to be great indifference on the part of truck engineers. The old hubodometer probably would record accurately were it not for the fact that it is placed in the most hazardous position. It is impossible, therefore, to keep records based on actual miles traveled, because there is no hubodometer made that will stay on the job.

I have asked engineers to provide a standardized radiator guard, or at least complete a job when they turn it out by applying a radiator guard. They, in many cases, leave this up to the owner.

I have repeatedly tried to find out just why it is necessary to remove the seat cushion in a motor truck, almost without exception, to fill the gasoline tank. Why can't we have a filler pipe extended out through the seat panel so that the tank may be filled without disturbing a lot of cushions and curtains?

### DISTRIBUTION OF MAINTENANCE COSTS

I believe that the following figures will interest those who have not gone into them in detail. Not considering drivers' wages, depreciation, interest and insurance, our operating costs are distributed as shown in table on page 249.

\*From a paper given April 19, 1923, before the Metropolitan Section, Society of Automotive Engineers, New York.

## Motor Bus Organizations

**NATIONAL MOTOR TRANSPORT ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; manager and secretary, E. B. Burritt, Fisk Building, 250 West Fifty-seventh Street, New York, N. Y.

**ARIZONA MOTOR TRANSPORTATION ASSOCIATION:** President, D. C. O'Neill, Douglas, Ariz.; secretary, F. A. Jones, 127 North Central Avenue, Phoenix, Ariz.

**MOTOR CARRIERS' ASSOCIATION:** President, W. E. Travis, president California Transit Company, San Francisco, Calif.; secretary, James G. Blaine, 1290 Bush Street, San Francisco, Calif.

**CONNECTICUT MOTOR STAGE ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; secretary, Edward J. Gildea, treasurer Congress Taxi Company, Danbury, Conn.

**DELAWARE BUS TRANSPORTATION ASSOCIATION:** President, George A. Moses, treasurer West Chester & Wilmington Transportation Company, Wilmington, Del.; secretary, C. S. White, president Delaware Rapid Transit Company, Wilmington, Del.

**MOTOR TRUCK ASSOCIATION OF FLORIDA:** President, W. T. Callahan, Miami; secretary-treasurer, D. E. McMann, 36 N. W. 1st St., Miami Fla.

**GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION:** President, E. A. Harrison, Bainbridge, Ga.; secretary, W. M. Riley, Decatur, Ga.

**INDIANA MOTOR BUS OWNERS' ASSOCIATION:** President, H. E. Jahns, general manager Jahns' Bus Lines, La Porte, Ind.; treasurer, W. E. Rentschler, manager Indiana Motor Bus Company, Plymouth, Ind.

**IOWA MOTOR TRANSPORTATION ASSOCIATION:** President, J. Edgington, Des Moines, Iowa; secretary, E. P. Cronk, Des Moines, Iowa.

**MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION:** President, E. Foster Moreton, president Moreton Trucking Company, Third and Howard Streets, Detroit, Mich.; secretary, H. H. Hardy, Fireproof Storage Company, Lansing, Mich.

**MINNESOTA MOTOR BUS ASSOCIATION:** President, Rodney S. Dimnick, president Touring Car Bus Company, 29 Seventh Street, North Minneapolis, Minn.; secretary, Earl F. Jackson, Endicott Arcade, St. Paul, Minn.

**NEW JERSEY BUS TRANSPORTATION ASSOCIATION:** President, John Morning, 408 Warren Street, Newark, N. J.; secretary, Harry Buesser, 79 Madison Street, Guttenberg, N. J.

**NEW JERSEY AUTO BUS ASSOCIATION:** President, George F. Seymour, Jr., 20 Clinton Street, Newark, N. J.; secretary, George L. Cowan, 20 Clinton Street, Newark, N. J.

**AUTO BUS ASSOCIATION OF NEW YORK STATE:** President, Stanley Chatterton, treasurer White Rapid Transit Company, Lima, N. Y.; secretary and treasurer, James J. Dadd, president Rochester Bus Lines Advertising Corporation, 120 Vermont Avenue, Rochester, N. Y.

**OHIO MOTOR BUS ASSOCIATION:** President, R. E. McCollum, Ohio Motor Bus Company, Columbus, Ohio; secretary, C. J. Randall, 419 Majestic Building, Columbus, Ohio.

**AUTOMOTIVE CARRIERS' ASSOCIATION OF OREGON:** President, Max H. Clark, Camas Stage Company, Portland, Ore.; secretary, J. L. S. Sneed, manager Oregon Auto Stage Terminal Company, Portland, Ore.

**PENNSYLVANIA MOTOR BUS OWNERS' ASSOCIATION:** President, Frank Martz, treasurer White Transit Company, Plymouth, Pa.; treasurer, W. J. Emerick, president Emerick Bus Lines, Bellefonte, Pa.

**WASHINGTON AUTO TRANSPORTATION ASSOCIATION:** President, A. C. Ellington, Des Moines Auto Company, Seattle, Wash.; secretary-manager, Erven H. Palmer, Terminal Building, Seattle, Wash.

**WISCONSIN MOTOR TRANSPORTATION ASSOCIATION:** President, A. C. Homan, Menasha, Wis.; secretary, E. H. Kambe, Caswell Block, Milwaukee, Wis.

	Per Cent of Total
Gasoline ..	30.99
Cylinder oil ..	2.25
Tire costs ....	2.59
Painting .....	1.39
Body repairs ....	4.75
Chassis repairs ..	35.29
Garage expenses ..	24.00
Total ....	100.00

From the above you will see that gasoline is one of the important items of expense. Gasoline should be saved, first, by knowing that the carburetor is right for the particular truck, and that any adjustments are made by a capable carburetor man. Better still, use a non-adjustable carburetor. Then teach the driver that a rich mixture which may get him over the grade without shifting gears is bound to waste 35 per cent; this waste will accumulate carbon, which will cause a bad working engine in a short time, and as a matter of fact if he would shift the gears he could go over the grade with the whole machine in better condition than the fellow who is kidding himself about wonderful flexibility or pulling power.

I believe that auxiliary air devices which are operated from the dash, as the driver may see fit, will accomplish nothing, but an auxiliary air device might be so constructed that it will function only at prearranged engine speeds by hooking it up with an accelerator pedal or fly-ball governor.

Tire costs, we must agree, are very low. As a matter of fact, the tire cost today is approximately 25 per cent of what it was in 1913 and 1914. Solid and pneumatic tires give at least four times the mileage they did in the period mentioned, and from two and one-half to three times as much service as the old mileage guarantee, which was from 3,500 to 5,000 miles on pneumatics and from 7,000 to 8,000 miles on solids.

The greatest item of expense is mechanical repairs to chassis. I believe the cost of mechanical repairs to chassis can be kept down only by proper garage employees; that is, inspector mechanics taking a stitch in time; by lubrication, which it is criminal to neglect, and last, but by no means least, instruction should be worked out to give the driver a more extended conception of his duties and responsibilities for the valuable equipment in his hands.

#### DISCUSSION OF THE PAPER

Systematic inspection and education of operators are the most important means of getting economy, said J. F. Winchester, in commenting upon the paper. Mr. Winchester, who is supervisor of motor vehicle equipment for the Standard Oil Company (New Jersey), urged the S.A.E. to standardize a cost accounting system, since the present forms for analyzing costs are too expensive to keep. A mechanical installation sheet showing the details of vehicle construction would also be a great help in handling maintenance work, particularly if the manufacturers would supply operators with up-to-date information on tolerance and fits. Such a record would make available accurate informa-

tion as to sizes of cylinders, pistons, gears and other replacement parts.

Cushion-type tires, Mr. Winchester believes, should be recognized by the state legislature and given a better rating than the solid tires, instead of being classed with them. Tire costs alone have little meaning, and the economy of different tire equipments should be judged only by a study of the general operating costs. To illustrate this he gave the following figures on two different types of tires, each used on fleets of twelve vehicles for slightly more than two years:

Tire Cost, Cents per Mile	Repair Cost, Cents per Mile	Mechanical Cost, Cents per Mile
2.72	19.43	17.53
1.67	7.29	13.17

Other parts of the vehicle that should be improved are the magnetos, as most of those now made are not as efficient as the old German magnetos made before 1914. The generator wiring should be installed more securely and generators made to work with the nickel-plate type of storage battery.

F. C. Horner, consulting transportation engineer of the General Motors Corporation, told of the maintenance system used by the London General Omnibus Company. The daily driver's report is the basis of the system. This is made on a form covering a month's operation. Each bus is inspected daily, however, all the important parts being examined, even though no trouble has been reported. As an example of the care with which the work is done, Mr. Horner said that the steering arms and connections, which are highly polished, are wiped off every night with a rag dipped in kerosene. This has reduced the accidents from steering gear failure about 30 or 40 per cent.

David Beecroft told of a study of fleet operation made among some 5,000 owners, of whom 50 per cent wanted simplification of their motor vehicle equipment. One such operator suggested a change in design so that universal joints are not required of those who are held responsible for lubricating many of the chassis parts.

### New York Association Active

THE Auto Bus Association of New York State held a sectional meeting on April 12 at Utica, N. Y. President Stanley Chatterton of Lima and Vice-President F. D. Carpenter of Black River presiding. A large number of bus men from Utica and vicinity attended the meeting, and every bus line represented that was not already a member joined the association. The association now has a membership of more than forty bus lines in the state, representing an invested capital of nearly \$5,000,000, and is adding new members rapidly.

At a directors' meeting, prior to the regular session, Secretary Dadd's mutual insurance plan was approved. This plan advocated joining the Merchants' Mutual Casualty Company of Buffalo as a subsidiary for two years, and if it seemed best to do so after that time to run its own mutual insurance. This mutual insurance is for

members of the Auto Bus Association only and its initial premium will be a flat reduction of 15 per cent on existing premium costs.

The association went on record as not favoring Assemblyman Jesse's bill relative to sightseeing buses being allowed to operate without a permit from the Public Service Commission, and the secretary was authorized to present the views of the association at the public hearing on the bill at Albany on April 16. At this hearing Mr. Dadd offered an amendment to the transportation law which would in the future obviate the necessity of such interpretation in the laws covering all buses.

Other meetings of the association were held during the week of April 15 at Massena, Ogdensburg and Watertown, with the same result as previous meetings, namely, an increase in the membership of the association.

The next regular state-wide meeting of the association will be held on Thursday, May 17, at Syracuse. This will be a meeting of the bus men of the entire state. Men of wide repute will speak. Bus owners and operators are urged to keep this date open so that they can attend the meeting.

Buses will run from various parts of the state to bring bus men to the state-wide meeting. Secretary Dadd has arranged with several bus manufacturers to run their demonstration models of buses over designated routes, on a scheduled time that will be announced later by letter to all bus men. Buses will start from Buffalo, Rochester, Watertown, Albany, White Plains, Binghamton, Hordel and other places, making stops all along the line until Syracuse is reached.

This arrangement will afford an agreeable and convenient method of reaching the meeting.

### Meetings, Conventions and Exhibits

- May—National Automobile Club of Commerce, Directors Meeting, Detroit, Mich.
- May 16—National Highway Traffic Association Automobile Club, 247 W. 54th St., New York.
- May 17—Auto Bus Association of New York State, Syracuse, N. Y.
- June 15—Motor Bus and Transportation Meeting, Piedmont Hotel, Atlanta, Ga.
- June 25-29—Automotive Equipment Association, Dixville Notch, N. H.
- July 11-15—Idaho Automotive Trade Association, Twin Falls, Idaho.
- Oct. 1-5—National Safety Council Exhibit, Buffalo, N. Y.
- Oct. 25-26—Society of Automotive Engineers (Production), Cleveland, Ohio.
- Dec. 19—Philadelphia Motor Truck Association, Philadelphia, Pa.



## Financing Sales on Deferred Payment Plan\*

BY HENRY FARMER

Farmer & Ochs Finance Company, New York

THE problem of merchandising motor vehicles has become so closely related to the problem of financing sales made on the deferred-payment plan that the one cannot be considered without taking into account the other.

It is stated, on good authority, that banking and financing organizations of the country must absorb yearly more than \$250,000,000 in notes or other paper used in the deferred-payment sales of trucks. The subject is therefore a pertinent one, as at present motor-truck paper is in bad repute with bankers, and to a large extent with finance companies.

The objectionable features to truck paper from a banking standpoint appear to be as follows: (1) Weak purchasers; (2) weak dealers; (3) long-term paper; (4) lack of co-operation by manufacturers.

If these reasons are sufficient to justify the banks in their attitude towards truck paper, what can be done to correct the situation? My suggestions would be as follows:

1. As regards weak purchasers. The manufacturers should endeavor to supervise sales of their dealers, especially those who are seeking finance arrangements, so as to prevent sales to purchasers who have no means beyond the original down payment. They should explain to the dealers the folly of selling without a sufficient down payment, and point out the inevitable result of such sales. The dealers should also be impressed with the importance of thoroughly investigating the purchaser, and with the wisdom of refusing to sell unless such investigation is entirely satisfactory. We have had transactions offered to us where the credit investigation has shown that the prospective purchaser has served a jail sentence and in many cases the men have been out on bail. This would indicate either no investigation on the part of the dealer, or an inclination on his part to take a gamble.

2. The appointment of weak dealers. The manufacturers should not appoint dealers without a thorough investigation, and should refuse absolutely to have any business relations with a dealer whose record is not clean. Dealers should not be appointed who have an inadequate financial standing, even if their reputation is good. The capital of many dealers is entirely tied up in trade allowances and they have no liquid assets with which to conduct their business.

The manufacturer should insist that the dealer has sufficient capital to take care of a normal trade-in inventory, and a surplus with which to conduct

his business properly. It is my opinion that until some plan is devised for correcting the trade-in evil, it will be difficult to improve the character of the paper much from a banking standpoint. Manufacturers should give greater supervision to the business methods of their dealers. Many dealers can sell trucks but they have no knowledge of how to run a business. These men need advice along the lines of properly organizing their sales, service and accounting departments.

If the dealers were convinced of the importance of having their customers' notes paid promptly, they would undoubtedly install a system of following up these notes and seeing that they were paid on the due date. The dealers should be impressed with the importance of meeting their indorsements promptly. Perhaps the present laxity is due to their financial condition, but many dealers appear to think it in order to allow the notes, if unpaid by the purchaser, to be protested and returned to the finance company, they relying on the collection from the purchaser before they really make good their indorsement.

3. Long-term paper. The manufacturers should attempt to discourage the selling of trucks on a long-term basis. While the eighteen-month paper on heavy-duty trucks might at times pay better than twelve-month paper, there is an inclination to extend it to the smaller models, for which there can be no excuse. The factory branches seem to be pioneers in this practice, and are extending the period in some cases, I am told, to twenty and twenty-four months.

4. Lack of co-operation by manufacturers. The manufacturers should co-operate with the banks in the resale of repossessed trucks, whether or not they are indorsers on the notes. They have the facilities for reconditioning and reselling the trucks, which no bank or finance company can have. I know of no better way of making truck paper more attractive to banks and finance companies than for the manufacturer to assist in securing a fair market price for repossessed trucks. Trucks properly sold should bring the amount of the unpaid notes if properly remarketed after repossession. In this way the trucks will be kept out of the hands of the so-called "gyps" and in time a staple resale value of trucks will be established.

From a banking standpoint I realize that these suggestions would not eliminate all the undesirable features, but they would at least help. Under our plan of financing automobile paper we have endeavored to assist the dealers and factories in making their paper more attractive to the banks.

This plan primarily contemplates putting the dealer in a position to finance through his local bank by means of a surety company bond guaranteeing the payment of the notes to the bank. The bond removes all question on the part of the bank as to the security of the collateral. The bank does not even have to concern itself as to whether the lien instrument is valid, or whether the truck has been insured, or the responsibility of the maker or indorser; the bond is an absolute guarantee to pay if the maker and indorser fail so to do. In order to secure such a bond the dealer purchases from his bank a certificate of deposit, payable to the surety company, for 10 per cent of the amount of the notes, and this certificate of deposit acts as a compensating balance to the bank for the loan and also as collateral to the surety company. The cost is 2 per cent per annum on the amount of the notes, which includes a coverage protecting the dealer against conversion of the truck by the purchaser. Where the dealer prefers to send the paper to us for discount rather than handle it through his local bank, we make an additional charge of 1 per cent per annum on the amount of the notes, making the total charge 3 per cent, if discounted by us. Dealers seem inclined to send their paper to us rather than discount it through their local banks. This, we believe, is partly due to the fact that they follow the line of least resistance, and also because they have, in some cases, direct loans with the bank and feel that this would be asking for additional accommodation.

The banks should consider this paper separate and apart from their regular loans to the dealers, for they are really buying securities at a rate of interest which they cannot obtain on other paper of equal value. Even where local banking arrangements are made the bank will reach its limit irrespective of the guarantees back of the paper, but after that limit has been reached the dealer can send the paper to us for discount. If this plan is followed, with the resources we have for money, I believe we can take care, through our plan, of a large proportion of the motor-truck financing of the country.

### Highway Body Elects Officers

AT A MEETING of the Lakes-to-the-Gulf Highway Association held at Sedalia, Mo., on March 15, Frank E. Atwood of Carrollton, Mo., was elected president. Other officers named were: J. A. Anderson, Princeton, first vice-president; Guy B. Mitchell, Branson, second vice-president; M. V. Carroll, Springfield, Mo., secretary-treasurer, and directors for Missouri counties traversed by the highway.

It is believed that the development of this highway will eventually lead to the formation of bus lines to serve the communities along the route, many of which are not now reached by the steam railroads.

\*Abstract of paper given Jan. 11, 1923, at Motor Truck Conference, National Automobile Chamber of Commerce, New York.



## Bus Talks at S. A. E. Meetings

How Maintenance Experience Is Used to Build Better Buses—Engineers and Service Men Discuss Mechanical Requirements in Operation

**N**EARLY every month the bus makes itself known at meetings of the Society of Automotive Engineers. In January at Minneapolis, at New York in February and March, matters relating to bus maintenance and construction were discussed. All of these were meetings of local organizations or sections of the engineering society. Now comes a national meeting held April 26-28 at Cleveland, where the business of motor vehicle transportation was the sole subject. The proceedings at this meeting are described elsewhere in this issue.

At a meeting held at New York on

January 3, mechanical requirements of bus service were discussed by M. O. Moeller, mechanical superintendent Mack Truck Company, Minneapolis. H. I. Bollum, president Twin City Motor Bus Company, Minneapolis, spoke on motor bus line operation.

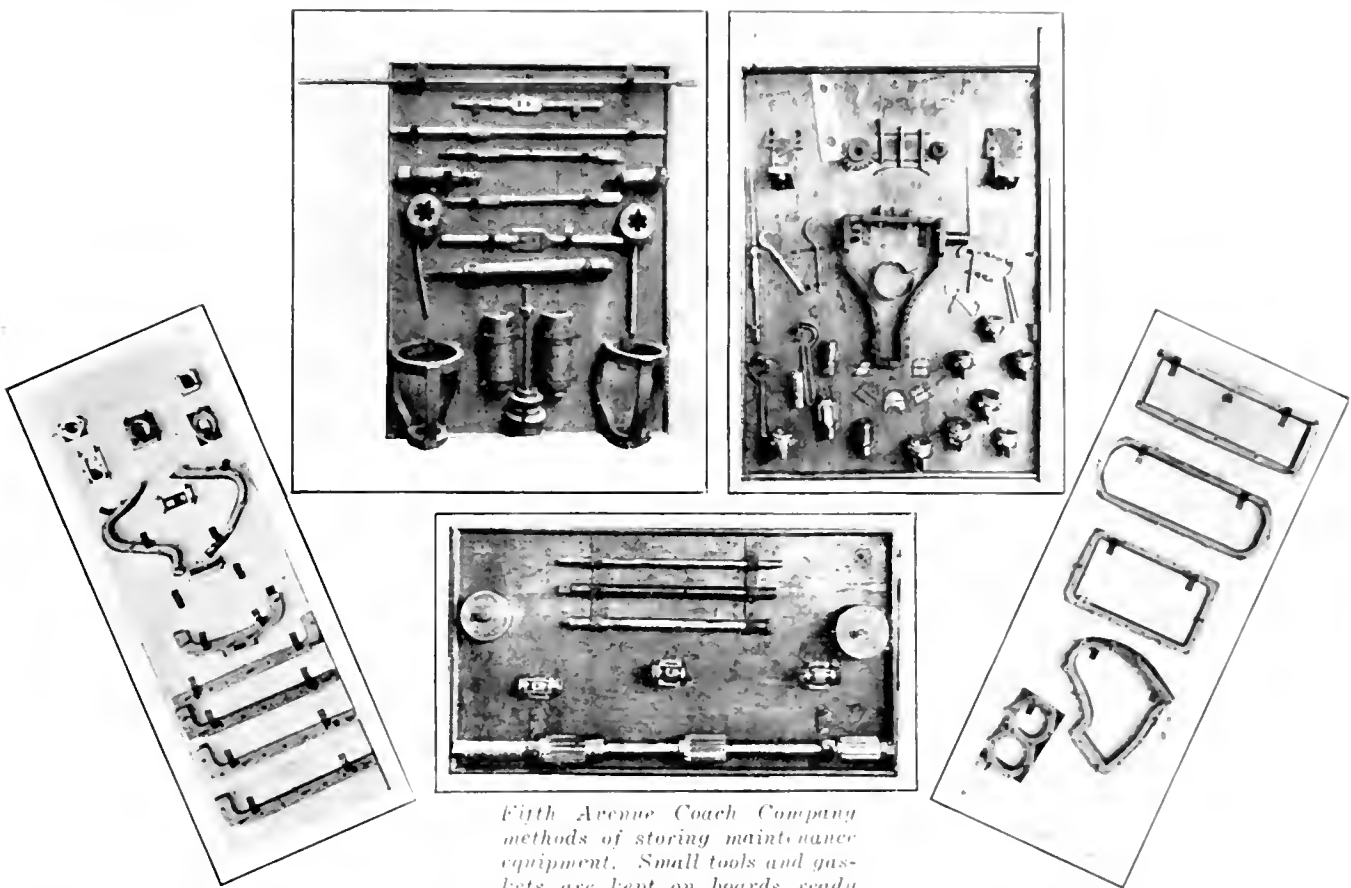
The different units required to give efficient operation were taken up in Mr. Moeller's talk. The engine, he believes, should not be too high speed since gear reductions can be used to get the necessary vehicle speed. Valves, magnets and carburetors, the parts which usually give the most trouble, should be

Second, the great activity of road building.

Third, the public preference for long transportation, particularly for short distances, the third one being due no doubt almost entirely to the first two causes.

The speaker advocated the unit repair system where engines or gear axles can be taken out and repaired with other out of line. In order to work this in the most satisfactory form, the bus operator must standardize on a few different models, as possible. With the constant changes in design now going on, the question of standardization is of course difficult.

The driver is one of the most important factors, however. According to his ability, his enthusiasm for his job and his loyalty to his employer, are op-



*Fifth Avenue Coach Company methods of storing maintenance equipment. Small tools and gaskets are kept on boards ready for service.*

March 15, W. P. Kennedy advocated the use in local transportation of what he calls a flexible vehicle, a mixture of trolley bus and storage-battery or gasoline design, whereby the wire could be used part of the time and the open road the rest. An abstract of Mr. Kennedy's paper appears elsewhere in this issue.

The February meeting of the same organization was featured by a talk given by R. E. Fielder, chief engineer Fifth Avenue Coach Company. Mr. Fielder's remarks, which appear herewith, describe how maintenance experience can be used in improving construction of equipment.

Before the Minneapolis section, So-

so placed that they can be changed in only a few minutes, instead of laying up the apparatus for several hours. Much cylinder and bearing wear, as well as difficulty with lubricating oil, can be overcome when a suitable carburetor is chosen.

### CAUSES OF BUS GROWTH

The great rise of the bus operating industry within the last five years is due, according to Mr. Bollum, to three causes: First, the improvements made in design by chassis and body manufacturers, and the development of the large pneumatic tires.

erating costs nominal or excessive. On the one-man bus he is chauffeur, mechanic, conductor and ticket agent all in one. He is the medium of contact between the bus company and the public. Upon him rests the responsibility of maintaining his schedule, collecting fares and acting as general information bureau. He is abused by one passenger for loading and by another for driving too fast. He gets all this blame from the passengers, besides being considered a road hog by other drivers. Through it all he is expected to maintain a genial disposition.

His employer expects him to look neat and clean, wear good clothes, despite the fact that rain or shine he

must change tires and occasionally make adjustments and repairs. He must know his place, not be presumptuous, but he must tactfully inform garrulous passengers that he cannot carry on a conversation and drive his bus at the same time. He is beset with requests to deliver messages and parcels along his route, regardless of regulations to the contrary.

#### SERVICE DISCUSSED AT NEW YORK

At a joint meeting of the Metropolitan Section, Society of Automotive Engineers, and of the Automotive Service Association, held on Feb. 8 in New York, automotive engineers and service station men discussed the relation of factory and service problems.

R. E. Fielder, chief engineer of the Fifth Avenue Coach Company, said that in bus operation where vehicles must be operated eighteen hours a day, 365 days in a year, it will never be profitable to go to an independent garage or service station and expect to get immediate attention, at any time of day or night. The operating company should employ experienced mechanics, and the time of these men must be divided so that it covers the whole period of daily operation.

The fundamental requirements of the operator, according to Mr. Fielder, are accessibility, simplicity, independent unit construction, light-weight units that are easily handled, elimination of surplus refinements, foolproof and accessible adjustments, and lubrication devices that are accessible and have adequate storage capacity. As an example of a system for making the experience of the operating end available to those who build the vehicles, he described the following:

1. Every operating unit should be supplied daily with a card so prepared that the driver can write thereon all the faults and defects with which he has had experience during that day. He should also note the mileage operated and fuel and oil consumed.

2. An experienced mechanical inspector should be stationed at the garage to receive the card from the driver, make an inspection of the vehicle in the driver's presence, and check the report according to the card.

3. Assuming that fifty or more vehicles are in operation, then adjustments and repairs will be handled by specialists, such as men on brakes, rear axles, transmissions, engines, ignition, fuel tanks and carburetion. To each of these men will be given a sheet on which will be marked the numbers of vehicles that need his attention. Thus the information checked by the inspector from the driver's card will be transferred to the mechanic's sheet so that he can make these adjustments and repairs in the garage. The mechanic will also be responsible for stating the correct information regarding adjustment or defects that he finds.

4. The mechanic's sheets, after being used by him, will be turned in to the main office, where the reports will be transferred to a master record sheet of

that particular vehicle. This master or general inspection sheet will serve as a guide to the mechanics in charge of the overhauls made every 2,000 miles, informing them of particular weaknesses. The general inspection sheet should also carry the miles the vehicle has operated, and the amount of gasoline and oil consumed.

5. The sheet having been completed by the mechanics or others in charge of repair and maintenance will be used to analyze operating difficulties.

In closing, Mr. Fielder called attention to the need of adequate tools and facilities for use in the maintenance department. This is imperative, as is also efficient care of such tools and equipment. In the accompanying illustrations are shown some simple methods he recommends of storing such equipment.

#### Battery Dimensions to Be Studied

THE second meeting of the automotive simplified practice committee was held in New York at the offices of the Motor and Accessory Manufacturers' Association on April 10. Representatives of nine associations out of the thirteen that form this committee were present. M. L. Heminway, chairman of the committee, presided.

In accordance with the resolution at the Washington conference mentioned in BUS TRANSPORTATION for April, 1923, page 201, following organizations were asked to name a representative on the committee: Aeronautical Chamber of Commerce, New York; American Automobile Association, Washington, D. C.; Automotive Equipment Association, Chicago; Automotive Electric Association, Cleveland; Automobile Body Builders' Association, New York; Motor and Accessory Manufacturers' Association, New York; Motorcycle and Allied Trades Association, Chicago; Motor Truck Industries, Detroit; National Automobile Chamber of Commerce, New York; National Automobile Dealers' Association, St. Louis; National Hardware Association, Philadelphia; Rubber Association of America, New York; Society of Automotive Engineers, Inc., New York.

It was voted to change the name of the committee from "Simplified Conference Committee" to "Automotive Simplified Practice Committee." D. C. Fenner was elected vice-chairman, but the election of permanent secretary was deferred until the next meeting. The chairman and vice-chairman, with C. F. Clarkson, were appointed an executive committee.

The work of the committee, it was decided, is to supplement that of standardizing and commercial bodies, in selling to the industry standards that have already been adopted. It will not interfere with or direct actual standardization except to outline to the standardizing bodies wherein the committee investigations may indicate the possibility of improvement in their standards. It was also pointed out that the committee was not in any way

working under the direction of the government, as it is entirely an effort on the part of the national organizations in the automotive industry to be of real service, and that the government's position is merely that of co-operation.

The first subject to be taken up by the committee is storage-battery dimensions. A. D. T. Libby and G. R. Lundane were appointed to analyze replies to a questionnaire sent out by the National Automobile Chamber of Commerce. They will determine to what extent the S.A.E. standards for storage-battery dimensions are now in use, and to what extent the battery manufacturers and car manufacturers vary from these dimensions.

At the afternoon session the committee discussed other existing S.A.E. standards which might eventually be considered. In order to have a plan of taking up new subjects as soon as the one under investigation has progressed sufficiently, a sub-committee on subjects was appointed, the personnel of this committee being C. F. Clarkson, chairman; Azel Ames and C. B. Warren.

The next meeting of the committee will be held on May 10 at the offices of the Motor and Accessory Manufacturers' Association, New York.

#### Bus Operators' Association Formed

AT A RECENT get-together meeting of all owners and operators of bus lines radiating from Watertown, N. Y., the Bus Operators' Association was formed. H. H. Vrooman, owner of the Sacketts Harbor-Watertown and Lowville-Watertown bus lines, was chosen president, and F. D. Carpenter, owner of the Watertown-Carthage and the Watertown-Adams bus lines, was made secretary and treasurer. A permanent organization will be sought and it is possible the association will incorporate.

Two problems confront the association. The first is to secure a suitable site for a terminal building. The buses now park on Public Square in front of the light and power building, but no waiting rooms or other facilities are obtainable at this location. It is not desired to locate the terminal at a distance from the city's center. The Chamber of Commerce and other industrial organizations will join the association to use every effort to secure a suitable location for a terminal.

The second problem is to provide for a uniform service through the entire year. Bus operators in the extreme northern section lost heavily last winter through snowfall, which made the roads impassable. The owners made every effort to keep roads open, but at times it was impossible to do so. An effort will be made by the association to secure financial assistance from merchants throughout the sections benefited to perfect a plan of maintaining schedules at all times.

## Trolley Buses and Flexible Vehicles for Street Railway Service\*

The Need for Closer Co-operation Between Automotive and Street Railway Engineers Is Emphasized—Opportunities for Established Transportation Lines—How the Bus Affects Real Estate Values

BY WILLIAM P. KENNEDY

President Kennedy Engineering Corporation, New York

THE purpose of this paper is to make evident the necessity for closer co-operation between the engineers of the automotive industry and the operating organizations in the street railway field. Further, to promote the utilization of railway power supply in the employment of flexible equipment in supplementing existing railway service.

This attitude of self-assurance combined with the natural handicaps of their mode of operation, such as rigidity of rail service impeding change in routes or location; inflexibility of equipment; danger to passengers due to increasing traffic in boarding and alighting from this equipment; increasing fares and limitations of transfers; all these have aided the public's general disposition to favor the more flexible service offered in bus transportation. The inclination to prefer the motor bus has been fostered by the public's increasing familiarity with the comfort and convenience of automobile transportation.

### STREET RAILWAY FOR MASS TRANSPORTATION

There is little question as to street railway permanency in rendering mass transportation in thickly populated districts, but changes in equipment and mode of service will be demanded urgently in other localities. It is reasonable to assume that these organizations will prepare to provide for these essential changes, in the direction of employing automotive equipment, and it is in these activities that there is a necessity for closer co-operation between the engineers of the automotive industry and those of the railway industry.

The railway engineer has been handicapped by the absence of competition. There has been a comparatively limited output in machines for his industry reducing the possibility of mass production, and, consequently, of necessity there have been limited sources from which he could procure competitively developed equipment. Likewise his sources of body structures were confined to comparatively few manufacturers. Furthermore, the necessity for providing against accident and damage enforced upon him a conservatism from which the automotive engineer has been almost entirely free. Now, however, after a period in which motor buses have been permitted to intrude upon his business field, with the consequent loss

of the most easily secured and profitable part of his sources of revenue, his attitude must change, and he must at once provide an acceptable solution in a new form of equipment.

The fundamental act is that the vehicles which would best serve the purpose are those that utilize partly, if not entirely, the power supply and distribution system, within the street railway. By such means properties representing large investment can be preserved and applied to a much greater range of service activity than was ever contemplated by their founders.

### TROLLEY BUS ONE SOLUTION

Obviously, the first step would be a broader application of the trolley bus. It cannot be expected to meet all the railway problems, but the desirability of its use in many cases is clearly indicated.

In this form of machine the vehicle is immediately released from the handicap of running on tracks, and while it is, so to speak, tied to the trolley wire, the flexibility of movement has many real advantages. It is free to pass roadway obstacles and can pick up and discharge its passengers at the sidewalk. Incidentally, its operation may relieve the railway organization from street paving obligations, and there should be a decided further economic advantage in a lower cost of mechanical upkeep due to the vehicle operating on rubber tires.

### DUAL POWER BUS EQUIPMENT

The next logical step in the development of more flexible vehicle equipment would be the inclusion in the trolley bus of a secondary source of power. This may be either a gas engine equipment or a storage battery charged either from the line or at the power station. The advantage of either of these is that supplemental service could be rendered beyond the limitations of the trolley, and there would be marked increased earning capacity in a machine so equipped. Whether the auxiliary power should consist of gasoline or electrical equipment would depend upon the extent of off-line service to be rendered. For instance, if the line operation was over 75 per cent of the bus route, and the auxiliary service over 25 per cent of the route, gasoline equipment would be indicated. If the off-line service represented 50 per cent of the performance it would be desirable to use central station power, and for this purpose a storage battery would be indicated. If charged in-

termittently from the line, this need not be very large, as the intermittent off-line service is not likely to be at any time more than a mile or two of operation.

### ELECTRIC TRANSMISSION EQUIPMENT

Aside from the trolley bus utilizing central station power, it may be well from the standpoint of lower transportation cost to consider vehicles having gasoline electric transmission systems.

The Tilling-Stevens petrol-electric system as developed in Great Britain has been in use there since 1908, and at the present time at least a dozen transportation companies employ fleets of from twenty to 300 motor buses of this type, and many more vehicles using this system are employed as motor trucks.

In passenger transportation the smooth operation, even acceleration and silence contribute both to its popularity and to its economy of operation. When the vehicle has been accelerated to its normal speed, the power required to maintain this speed is a small percentage of that required for acceleration. Therefore, the engine may be slowed down almost to idling speed, but the electric motor speed and consequently the vehicle speed is maintained by reason of the change in regulation of motor and generator fields. Well substantiated claims are made that both fuel consumption and maintenance costs are low in these vehicles.

The electric railway organizations being in effect electric transportation engineering institutions should be more inclined to prefer electrical equipment than mechanical, and consequently, the obstacles which have existed to the application of electrical transmission systems are likely to disappear. It would, therefore, be well for automotive engineers to refresh their knowledge of the systems which have been in isolated use, so that any superior operating value may be available for electric railway organizations using motor vehicle equipment.

### BODY AND CHASSIS REQUIREMENTS

Body and chassis requirements peculiar to mass transportation have not yet received much consideration, or at least have been sidetracked by the necessity of using material and equipment designed for other purposes, but constituting the only kind available for motor bus construction.

Is it any wonder then that the conservatively trained executives in public passenger transportation fields are reluctant to adopt this misfit equipment? As automotive engineers, we are principally concerned with the design, manufacture and application of isolated unit vehicles where, in the passenger car direction, speed, luxury and comfort are the ultimate attainments; and in the commercial direction, the standardized production of merchandise vehicles to operate with tolerable satisfaction under a great variety of service conditions. On the other hand, the street railway engineer and executive have

\*Abstract of paper presented March 15, 1923, before Metropolitan Section, Society of Automotive Engineers, New York.

been required to provide rigidly standardized transportation under conditions where failure is not tolerated, where catered to and often complied with under trying conditions, and where "safety first" has even been more vital than continuity of operation.

#### PROSPECTIVE BUSINESS FOR STREET RAILWAYS

With flexible vehicles operated to a large extent under the advantages of central station power, new fields of business are immediately opened up to the electric railways. Their city passenger transportation can be materially augmented with much less investment than similar expansions previously called for. Sightseeing transportation is within their business province; summer touring service is a possibility; more important than these is the opportunity to handle the local transportation of merchandise, parcel post, and express; as well as local freight transfer for merchants and manufacturers, and the possibility of collaborating with the railroads in putting into execution the much-talked-of store-door delivery. Such operations may require changes in their existing franchises, but these changes or enlargements should be readily secured in view of the advantages rendered to their communities.

#### FLEXIBLE EQUIPMENT REQUIREMENTS

Having indicated the directions of expansion, we may return to the body and chassis equipment necessary to meet the new requirements. In seeking a solution of the problem we must presuppose trials to insure the performance required, and to safeguard the investments to be made for such new equipment. Demand principally exists for large carrying capacity with low operation cost and one-man control. Other features sought are low center of gravity and floor, large seats and wide aisles, with smooth acceleration, ample power, adequate brakes, and permanency of the power plant under continuous operation. These requirements cannot be supplied in machines designed primarily as trucks. The special service requirements demand correspondingly special designs.

A combination tractor and trailer design has many advantages. This type of design will provide the following features:

- Three axles for load distribution of passengers and power plant.
- Three sets of springs for flexible suspension.
- Steering on all six wheels, resulting in short turning radius.
- Brake application to two axles, as well as to drive shaft.
- Power plant equipment confined to tractor part. This allows of wide, low-hung body, comfortable for seated and standing passengers.
- Tractor may be detached from trailer section for ease of repair and maintenance.
- Trailer bodies of open and closed types may be interchanged.
- Carrying capacity up to 100 passengers may be provided for within reasonable vehicle length.

Extending the length of vehicles usually handicaps their turning ability, but with three axles, all performing

turning functions, any reasonable turning radius required for city operation can be attained.

This type of vehicle having included in its power operating equipment the combinations necessary to utilize central station power, or to operate independently, is a step in the direction of least departure from existing street railway practice; it provides for utilization of the cheap power which they are equipped to furnish; and fundamentally tends towards preservation of their existing property and investment with a marked extension in the territory served.

The field for expansion is enormous, and the automotive industry should recognize that in the street railway organizations, taken collectively, there exists a greater potential group-consumer for its products than has ever existed in any single direction. In other words, here we find what may be practically regarded as a unit group of customers experienced as no others have been in the utilization of transportation equipment with requirements which are uniform in character, and the executives and engineers of which are particularly qualified to co-ordinate with the engineers and executives of their own industry.

#### DISCUSSION OF MR. KENNEDY'S PAPER

The problem before everybody interested in transportation, according to G. C. Hecker, special engineer American Electric Railway Association, is the co-ordination of all facilities available. There is no conflict between the electric railways and the motor vehicle industry. Instead, there is the heartiest co-operation. Mr. Hecker made the following suggestions in respect to automotive equipment for passenger transportation service:

1. Development of designs should be along such lines as will permit a maximum of standardization.
2. Adequate consideration should be given in the design to the inclusion of such safety features as have proved practicable.
3. In so far as it can be economically justified the design should embody details that will provide for the maximum comfort and convenience of passengers.
4. For city service extensive study should be given to entrance and exit design, so as to facilitate rapid loading and unloading of passengers.
5. In the design of buses to be operated by one man, provision should be made for satisfactory collection and registration of fares.
6. If practicable in one-man buses, apparatus should be developed so that the operator can call out streets without facing the rear of the car.

R. E. Fielder, chief engineer Fifth Avenue Coach Company, New York, took exception to Mr. Kennedy's statement that the Fifth Avenue Company would have continued the purchase of gasoline-electric motor buses were such equipment available, in regular production. He said that this design, while in use from 1908 to 1914, had been given up for several reasons. The gasoline consumption was much greater than that of the mechanical-transmission buses, and although the vehicles were similar, other than for the electrical transmission, the unladen weight of the electric type was 664 lb. greater

than that of the then standard bus. When defects occurred with the electrical units there was often difficulty in discovering the fault, and a great number of useful bus-hours were lost. Since 1916 the company has tested modern electric transmission systems, and the result has justified the decision to use entirely buses with mechanical construction.

#### NEW YORK'S TROLLEY BUSES

Prof. Morton Arendt, representing Commissioner Grover A. Whalen of the New York City Department of Plant and Structures, said that the trolley buses in Staten Island could be operated at 25.6 cents per car-mile, whereas the gas bus operation over the same route would cost 33.9 cents per car-mile. The difference in favor of electrical equipment will be even greater with more vehicles operated, because the charge for overhead construction would have been less. He called attention to the value of the trolley bus in developing localities, because of its permanent construction. Real estate along Staten Island trolley bus lines has increased enormously in value. In Baltimore eighty homes were erected and real estate property increased about 20 per cent in value after a trolley bus system was installed.

At present twenty-two trolley buses are operated on two lines in Staten Island, seven of these having been in service for two years and fifteen for about six months. On the new City Island line, now being built, twenty-five buses will be operated, so that it will be a real mass transportation project.

The first designs used on Staten Island were so high above the ground that two steps were necessary, and also the wheel gage was too narrow. In the latest type a broad gage has been used, which eliminates the swaying previously experienced, and the wheels have been brought forward under a hood, thus lowering the floor to 28½ in. loaded and 30 in. empty. On the first design leather seats were used but these seemed to be unpopular and were mutilated by the passengers. Consequently, cane seats are now installed in all new vehicles.

Frederick C. Horner, transportation engineer General Motors Corporation, told of his study of the trolley bus in England. Many tramway men there believe that the trolley bus has all the disadvantages of the trolley and none of the advantages of the gasoline vehicle. In Bradford, where eighteen trolley buses are used on a 9-mile route, they lost money in 1921, while the tramways showed a profit. The trolley buses cost 42 cents a car-mile to operate, while the revenue was only 27 cents. Expense and revenue were 47 and 54 cents respectively for the tramway, or a profit of 7 cents a car-mile.

Others who discussed the paper were C. W. Kellogg, Stone & Webster, Boston, and C. J. McPherson, J. G. Brill Company, Philadelphia.

# News of the Road

From wherever the bus runs, brought together the important events, here presented to show the movements of the day.



## Service Proposed for Milwaukee

Railway Subsidiary and Independent Operators Both Anxious to Furnish High-Grade Service.

**D**DOUBLE-DECK motor bus service for the city of Milwaukee, Wis., has been proposed by a group of Chicago promoters. An ordinance introduced in the Milwaukee Common Council would permit the operation of double-deck buses on two routes by the Milwaukee & Suburban Motor Coach Company, which is the name under which the promoters propose to act. One route would be from the upper east side, the choice residential section of Milwaukee, to the heart of the downtown business district and thence through the Washington Park district, a residential section which has developed very rapidly during the past few years. The second route would in a general way parallel the first route. According to press reports, the promoters have offered to pay the city of Milwaukee \$100 per bus per year and to permit the city to acquire control of the company at a later date.

The ordinance has been referred to the Council committee on public utilities and a hearing will be held within a short time. According to the promoters they are ready to place twenty-eight buses in service at the start and to increase this number until sixty are in operation.

Following the announcements made in the daily papers of the attempt of Chicago interests to obtain a franchise from the Common Council for the operation of buses in Milwaukee, the Wisconsin Motor Bus Lines, the motor bus subsidiary of the Milwaukee Electric Railway & Light Company, stated that last year it arranged for the operation of motor buses along a route very similar to the one described above, but did not start this service at that time because the buses it had obtained were not considered entirely suitable for the service. Early this year contracts were let by that company for the latest type of double-deck bus and it is planned to operate buses of this kind on an east-west route in Milwaukee as soon as they are delivered.

The Wisconsin Motor Bus Lines is preparing to start double-deck service under the state law providing for the filing of a bond with the Wisconsin Railroad Commission and the approval of the route by the commission. Such bonds were filed last year and had been approved by the commission. It is probable that a fare of 10 cents will be

charged and that the proposed bus service will be operated independent of the city rail service.

The Milwaukee Electric Railway & Light Company already operates a number of feeder bus lines in the city, which are a part of the city railway system, however, and interchange transfers. On its Lincoln Avenue bus line, which has just recently been established, a charge of 3 cents for a transfer is made and the business gives every indication of growing to substantial proportions.

## Bus Operation to Start in St. Louis

Augustus Barnes, local representative of the United States Bus Transit Company in St. Louis, Mo., has announced that his company will shortly begin operation in that city. In behalf of the company it was explained in St. Louis on April 24 that forty buses had already been built for the company and that the first shipment was expected to arrive within the next few days. The buses are being turned out at the rate of six per week. As now proposed the company will start operation in anticipation of the opening of the municipal opera season at the Forest Park open air theater on May 28.

Operations will be started over four routes.

In the evening a theater route will be operated and during the municipal opera season a line of buses from Delmar and DeBaliviere to the theater and return. A charge of 10 cents will be made with transfers from the east and west lines to the north route and vice versa.

## Dr. V. K. Irion for Rights in New Orleans

An informal application has been made to the Mayor and members of the Commission Council of New Orleans, La., by Dr. V. K. Irion, of 8013 Poplar Street, for a franchise to operate a system of buses in New Orleans. It is expected that the matter will be formally submitted to the Commission Council at its next meeting. Dr. Irion refused to disclose at this time who would be his associates in the proposed venture, though he did state that the bus line was not intended to compete with the railway lines of the New Orleans Public Service, Inc. It is also proposed, he said, to cover territory adjacent to New Orleans not reached by rail transportation or to which rail transportation is too infrequent to make the trips expeditious to passengers journeying to and from those points.

## Columbus-Zanesville Service Started

Another Ohio Interurban Places Buses in Operation to Supplement Electric Railway Service.

**B**US operation by the Indiana, Columbus & Eastern Traction Company in Ohio, held in abeyance pending action by the State Legislature on the motor bus licensing and regulatory bill, was started between Columbus and Zanesville on April 8, following adoption of the bus measure a few days before. The Columbus-Zanesville bus service is regarded as the forerunner of a network of such lines in Ohio to follow the regular routes of the traction lines and to supplement the service of the railway.

Copies of the new schedule have been filed with the State Public Utilities Commission, together with tariff rates, as required by the new state law. The bus service is under the general management of R. L. Jacobs, Springfield, who has been relieved from duty as dispatcher in the Springfield offices of the railway.

The bus company, known as the Zanesville & Dayton Motorbus Company, was organized recently for the express purpose of helping the traction company in its campaign against outside bus competition, which had been making extensive inroads into its revenue. Terminals of the traction line in the various cities are used as stations by the buses.

The Indiana, Columbus & Eastern Traction Company has already placed orders for buses to be used on other routes of its lines, and within a short time it is expected to establish service between Columbus and Springfield and Springfield and Dayton, later extending to all points served by the company.

**Buffalo Ready to Grant Bailey Avenue Permit.**—By a unanimous vote the members of the Council of Buffalo, N. Y., on April 14 denied the petition of the International Railway for a permit to operate a bus line on Delaware Avenue. Its application for a permit to run buses on Bailey Avenue was approved on condition that the fare will be the same as charged now or will be charged on existing lines of the company. Corporation Counsel Rann was instructed to prepare an agreement covering the Bailey Avenue petition. The railway wanted to charge 10 cents and 3 cents for a transfer on the proposed Delaware Avenue line. The fare on the Bailey Avenue line is to be 7 cents or a token with no charge for a transfer.



## Buses Up to Voters

Apparently It Is Up to People of Los Angeles to Decide for Themselves Their Transportation Problem.

ON MARCH 20 the Board of Public Utilities of Los Angeles, Calif., concluded and filed with the City Council its report on the transportation problem in the city. The board's report was, in turn, forwarded to the two railways that furnish local service. The report suggested that the two railways carry out certain improvements and reply within ten days as to their acceptance of the program demanded by the board.

On April 5 the management of the railways filed an answer to the board's report. The companies agreed among other things to extend six car lines, construct four new lines and give temporary bus service on twelve other lines, but requested delay on nine, and refused to make the changes suggested by the board on eight lines. The estimated cost of the improvements which the rail lines agreed to carry out is \$6,000,000.

In some cases where the board recommended that motor bus "feeder" lines be installed the street railway systems refused to accept the board's report, claiming that the business to be had did not warrant such bus lines, and in other cases certain unimproved streets made bus service impossible. Recently, a member of the board made an inspection trip over certain streets on which bus routes were recommended by the board, and this member stated that a large number of the streets were in a deplorable condition and before service was established these streets should be improved, while certain other streets, now permanently paved, should be repaved before they could be used for bus service.

The railway management states that, in its judgment, there will not be any reason for an increase in railway fares in Los Angeles unless motor buses are given franchises to run on streets parallel to existing car lines, but if the motor buses are granted such permits to parallel the street car lines it will mean that an increase in fares of the railways in Los Angeles will be absolutely necessary.

Commissioner Bogardus claims that as the railways have refused to take advantage of their chance to agree to provide adequate facilities it now remains to find a means to obtain the transportation needed. This is taken to mean that the motor bus will be brought into the Los Angeles transportation field to provide additional transportation service.

It will be recalled that the People's Motorbus Company was successful in having two initiative petitions certified and placed on the ballot for the May 1 elections. In one of these it is intended the people shall pass upon the question of repealing the existing "jitney" bus ordinance. This measure prohibits motor bus operation in the

congested downtown districts. In the other measure the people are to say whether the City Council shall give a franchise to the Motorbus Company to operate a motor bus system on 61 miles of Los Angeles streets paralleling the lines of the two railway companies. A very active campaign is being conducted in behalf of these measures. The Motorbus Company has imported one of the double-deck type of buses into the city and is driving it about the downtown congested streets, to gain public favor. The Board of Public Utilities has taken the trial motor bus and is making tests, under dense traffic conditions, in running it along the streets into and out of the street car lines, handling passengers free, to demonstrate and ascertain what effect, if any, the bus will have on traffic.

The City Council does not plan to take any action on the motor bus question until after the election on May 1, when the voters will express themselves on the subject.

## New Crosstown Bus Line for Chicago

The City Motorbus Company, Chicago, has started a crosstown line on one of the streets in the western part of the city. The City Motorbus Company originally hauled the crippled children to the city schools of Chicago and held its contract with the city for eight years. During this time it operated twenty buses of the twenty-passenger type and continued this operation up to five months ago. This line is equipped with four twenty-passenger buses, operating on a seven-minute headway. Operating on a schedule of this kind a bus makes approximately 125 miles a day.

Buses are operated from 7 a.m. until 6:30 p.m. Inasmuch as this is a crosstown line and does not go to the business center the bus line acts more as a feeder to the elevated and steam railroad stations, which it passes. The cash fare on the line is 10 cents, with three tickets for 25 cents.

## British Bus News Summarized

Growing Number of Independent Operators in London Becoming Traffic Menace  
—Attempt to Link Buses and Trolleys Fails—Report of Committee on  
Motor Vehicle Taxation Not Yet Ready

THE number of independent competitive buses which are being put on the streets of the British metropolis must be giving concern to the London General Omnibus Company. So far the number for each competitive firm or company is not large, but there is a growing number of such firms, and it is difficult to say what, as they develop, the outcome may be. The point of view of the London General Omnibus Company of course is that it has spent millions on development and should have protection. The newcomers' idea, evidently, is that the streets are free to all. The public apparently does not care who owns the buses so long as the service furnished is comfortable and speedy.

The position of the Metropolitan Police, the licensing authorities, is a difficult one. Apparently they have no power of discretion; every bus, no matter who owns it, which is presented for license is licensed to run on the London streets if it conforms to the police regulations as to size, weight, etc. Thus it may well be that a time will come when London thoroughfares will be still more choked than now with traffic, largely consisting of buses which will be running either at no profit or at a loss. The remedy, of course, is a traffic board for London which would regulate, control and adjust all local passenger traffic. The creation of such a body has been recommended by royal commissions and Parliamentary committees (appointed to investigate the subject) and by local authorities from time to time for many years, but nothing has resulted. In Britain generally outside of London no difficulty of the kind arises, because the

Town Council or County Council has full power to license and regulate bus traffic. But in London, with its multitude of local authorities possessing only limited powers, and with the licensing of buses in the hands of the police, who have no power of discretion, chaos threatens. Apparently the only power which the police have, apart from unlimited licensing, is to direct what streets should not be used by buses.

The experiments have failed which have been carried on for some two years to provide a linking up of bus service between the London County Council Tramways' southern and northern divisions by means of London General Omnibus Company's buses across the tramless area of the West End. Interchange arrangements at various points were with one exception withdrawn some time ago, and now the single exception has disappeared. On March 27 the London General Omnibus Company intimated that the Hampstead Heath and Thames Embankment route would cease to operate. It was at the Embankment that connection was made with the County Council's tramcars. The route was specially instituted by the London General Omnibus Company to provide a connection between north and south London by linking up with the L. C. C. Although it has been running for a considerable period and extensively advertised, repeated traffic tests which have been made show the patronage of the line to be small, and the route is accordingly withdrawn. Through tickets were issued which gave the passenger an advantage for certain distances of a halfpenny in the fare.

In the latter part of March Colonel



Ashley, Parliamentary Secretary to the Ministry of Transport, informed a deputation from important British motor organizations that it would not be possible for the report of the departmental committee on the taxation of motor vehicles to be received in time for consideration in connection with this year's national budget. The object of the deputation was to impress on the government the importance of adopting a system of taxation based on horsepower or weight, and that the change should be introduced by Jan. 1, 1924. It was contended that the present system was hampering British trade and was unjust. Colonel Ashley replied that it was impossible for him to express any views on the merits of the subject until the committee which was examining it had reported. He regretted that it would not be possible for the report to be received in time for consideration in connection with the introduction of the budget this year. Very wide interests were affected, and it was only reasonable that all parties concerned should have an opportunity of stating their cases. As to a suggestion that Parliamentary procedure might authorize a general power which could be left for departmental action, it was not possible to impose taxation by regulation. He would, however, examine what methods were open for insuring that any decision of the government, taken on the report of the departmental committee could be carried into effect before Jan. 1, 1925.

### Service Improvements to Be Made at Long Beach

Complaints were filed recently with the city officials of Long Beach, Calif., regarding the motor bus service rendered by the Long Beach Bus Transportation Company and other independent bus lines serving various sections of the city. It has now developed that the improvements demanded to be made in the service rendered patrons by these various operating bus companies of Long Beach will be carried out without the necessity of legislative action. This conclusion is a result of promises made to the City Council by representatives of the bus lines involved.

A system of universal transfers from one bus line to another was declared impractical by bus company officials. The question of equipping the buses in operation with pneumatic tires was discussed and the bus operators declared a change would be impossible because of the danger of punctures.

The bus companies have agreed, however, to install proper ventilating systems in their buses and to maintain the buses in better condition from a standpoint of sanitation. Furthermore, they agreed with the city officials to exercise more care in the selection of the bus drivers and to extend more courtesy to the riding public, as well as

to increase the service rendered by the various bus companies through the medium of additional buses.

### New Jersey Railway Applies for Permission to Operate Bus Line

Plans of the New Jersey Transportation Company, a subsidiary of the Public Service Corporation of New Jersey, Newark, to operate buses in Belleville were further advanced recently when the company filed with the Belleville Town Commission an application for permits authorizing bus operation between Newark city line and Nutley-Belleville line. The application was laid on the table for consideration.

At the start it is proposed to furnish ten-minute headway during the morning and evening rush-hour periods, with a continued service under longer headway during the non-rush periods of the day. The company will agree that if traffic increases so as to justify a shorter headway, increased facilities, sufficient to meet reasonable traffic demands, will be provided.

As it is intended there will be an operating agreement covering the transfer of passengers between cars and buses, the rate of fare to be charged on the buses will be the same as that charged street car passengers, including the privilege of obtaining a transfer from bus to car and car to bus upon payment of 1 cent for each passenger so transferred. The company seeks an exclusive right.

### Nothing But Buses in Newburgh

The three remaining trolley cars of the Orange County Traction Company, Newburgh, N. Y., were taken off the streets of Newburgh on March 31, making it exclusively a bus city. According to officials of the Newburgh Public Service Corporation, the successor to the railway, 33 per cent more persons have ridden in buses during the past winter than rode in trolleys during the similar period in 1922. A bus terminal 200 ft. x 25 ft. is now in course of construction by the Newburgh bus concern. Five additional buses have been ordered from the Fifth Avenue Coach Company.

In bringing about this change to a completely motorized system the Newburgh Public Service Corporation has absorbed the Hudson Transit Corporation. The former corporation is headed by Benjamin B. Odell, ex-Governor of New York State. The latter concern was controlled by Didsbury, Aber & Didsbury, Walden. With the Hudson Transit Corporation, the Newburgh Public Service Corporation acquired an additional eleven buses, giving it a total of twenty-five buses, all in operation. Fourteen are Fifth Avenue Coach Company buses, eight Mack buses and three Dodge Brothers buses. The two latter came in with the Hudson Transit Corporation purchase. D. G. Aber has been made manager of the Newburgh Public Service Corporation.

### Railway to Operate Buses in Rochester and Utica

The New York State Railway, Rochester, N. Y., is getting into the bus business in earnest. This is shown by the fact that orders for twelve buses were placed during the week ended April 21 and that on April 24 orders were placed for the Rochester Railway-Coordinated Bus Lines. It is the Utica Railway-Coordinated Bus Lines, Inc., both recently incorporated under the laws of the state of New York. The buses are scheduled for delivery late in June. They will be of the twenty-five-passenger type, Broadway coach, with Kuhlman bodies. Five are of the trolley bus type for use on Dewey Avenue, Rochester, and seven are gas-line vehicles which will be distributed in various cities. The gas-line service proposed for Rochester is an extension of the Dewey Avenue rail line into the adjoining town of Greece. In Utica service is planned across town, east to west, over the Parkway. Bus developments by the same interests are pending also in Syracuse and Schenectady.

### Another "No!" Vote in Saginaw

For the second time in a period of five months electors of Saginaw, Mich., on April 2 rejected a street car-bus franchise proposal. The proposal which went before the voters on April 2 was a resubmission in an amended form of the Saginaw-Bay City Railway's offer defeated last November.

In the meantime, however, the city also voted down the so-called Wade-Henning omnibus ordinance. This proposal was submitted on March 7.

The new chief executive of the city is Albert W. Tausend, elected over George Phoenix. Mayor-elect Tausend supported the franchise, and although his opponent made no open fight against it, he was not in accord with the measure. Mr. Phoenix is a member of the Council and has two years to serve in that body.

With the appointment of Frank A. Picard as city attorney, friends of street car-bus transportation in Saginaw, Mich., are looking forward to an early solution of the difficulties confronting Saginaw since bankruptcy proceedings in August, 1921, caused a suspension of electric railway service.

Naming the city attorney is the first step of the new City Council toward public conferences between the grantee, Otto Schupp, and whomever he may select to meet with the Council and prepare a franchise to be submitted to the people.

### Another Wisconsin Inter-urban Line

Through bus service between Fond du Lac, Wis., and Neenah, via Oshkosh and intervening towns, will probably be established by the Eastern Wisconsin Electric Company by June 1 on an hourly schedule and alternating with

the interurban cars. B. W. Arnold, manager of the company, announces that five new sedan buses will be purchased.

A conference was held recently, attended by Mr. Arnold, J. P. Pulham, vice-president and general manager of the Wisconsin Public Service Corporation, and A. K. Ellis, general manager of the Wisconsin Traction, Light, Heat & Power Company, Appleton, for the purpose of considering the establishment of a through motor bus passenger service between Fond du Lac and Green Bay. The Wisconsin Public Service Corporation operates an interurban system between Green Bay and Kaukauna. The company represented by Mr. Ellis operates between Neenah and Kaukauna.

## Railway Offer Approved

License Expected to Be Issued Soon for Additional Service in Springfield—Independent Operator Seils Out

AN OFFER of the Springfield (Mass.) Street Railway to enlarge its bus service by putting on two new lines was approved by the transportation committee of the City Council on April 18, and it was understood that licenses would issue promptly and the service be instituted within a few weeks. A third route is proposed to be established later in the season. These are in the nature of crosstown and feeder systems and will not parallel electric railway lines.

Three other routes proposed by the transportation committee were not regarded as feasible by the company at this time, President C. V. Wood insisting on the rule that all such departures should be predicated on definite promise of public support. The company has bought three buses and one additional bus is adjudged sufficient for immediate needs.

When the present Hampden County Memorial Bridge bus is replaced with trolley service, probably some time late this year, the bridge bus will be available for some other line.

The displacement of independent bus operators, as contemplated by the present arrangements, will, however, entail many changes for the future, in the event that the plan to grant the railway a monopoly of the service should find fulfillment a year hence.

Whereas independent jitneymen are required to furnish a bond of \$10,000 each as protection against accident claims, the railway will be bonded under a general arrangement by which the company is liable for claims for accidents on any department of the service, where blame may be charged against it.

Pending the time when the monopoly shall become effective, tentatively set for May 1, 1924, applications are being received from persons desirous of establishing independent bus lines running out of the city. One application is for a route from Springfield to the town of Wilbraham, and another calls

## Tabular Presentation of Recent Bus Developments

Company	Address	Route
<b>Incorporations</b>		
Cerame Motor Bus Co.	East Liverpool, Ohio.	East Liverpool
Dayton & Xenia Motorbus Co.	Dayton, Ohio.	Dayton and Xenia, Ohio
Gray Motor State Line, Inc.	Hibbing, Minn.	Madison and Janesville, Wis.
Maulak Auto Transit Co.	Barnesville, Minn.	Barnesville to Hawley, Minn.
Simpson Motor Bus Company	Carrollton, Ill.	
Milwaukee & Suburban Motor Coach Lines	Milwaukee, Wis.	Milwaukee and vicinity
Cleveland-Lorain Bus Company	Cleveland, Ohio	W. H. Dunn, R. W. Sanborn,
<b>Lines Started</b>		
John Spencer	Marion, Ohio.	Bucyrus and Marion, Ohio
A. D. Fletcher		Decatur and Hume, Ill.
John Speer	Marion, Ohio.	Bucyrus to Marion, Ohio
Edward E. Sweet	Woodhaven, Long Island, N. Y.	Howard Beach and Woodhaven
Somerset Auto Bus Co.	Hion, N. Y.	Shuttle service in Hion, N. Y.
Zanesville-Dayton Motorbus Co.	Somerset, Pa.	Somerset to Johnstown
Woodward Star Coach Line	Pontiac, Mich.	Zanesville to Dayton, Ohio
Louisville-Lexington Bus Co.	Lexington, Ky.	Pontiac to Highland Park, Mich.
City Motorbus Co. of Chicago	Chicago, Ill.	Lexington to Louisville, Ky.
Blue Streak Bus Line	Columbus, Miss.	Chicago to Austin, Ill.
Mr. Zumwalt	Columbia, Mo.	Out of Columbus, Miss.
Bon Air Bus Line	Mobile, Ala.	Jefferson City and Columbia, Mo.
		Bon Air and Mobile, Ala.
<b>Applications Filed</b>		
Samuel A. Smith	Lowville, N. Y.	Alder Creek to Lowville, N. Y.
Washington Interurban Railway	Washington, D. C.	Washington, D. C., to Brandenburg, Md.
William Marshall (Note 2)	Emira, N. Y.	Emira and Watkins Glen, N. Y.
Whitehall Auto Bus Company	Whitehall, N. Y.	Tienderoga to Cambridge, N. Y.
Clyde G. Albrethy	Hornell, N. Y.	Hornell and Reclister, N. Y.
Rochester & Penfield Bus Line, Inc.		Rochester to Penfield, N. Y.
Paul Atkins	Fort Edward, N. Y.	Salem to Fort Edward, N. Y.
Logan Valley Bus Co.	Attoona, Pa.	Pleasant Valley to Attoona, Pa.
George Pattin		Headsburg and Calistoga, Cal.
J. F. Bickford		Elk and Older Springs, Cal.
Inter-State Motor Transit Co.	Butler, Mo.	Butler to Harrisonville, Mo.
Ross Forsythe		Fresno and Camp No. 2, Cal.
Wm. Lester	Central Bridge, N. Y.	Schenectady to Central Bridge.
New Jersey Transportation Co.	Newark, N. J.	Newark to Nutley, N. J.
Hudson Bus Transportation Co.	Jersey City, N. J.	
Charles Phillips	Little Falls, N. Y.	Little Falls to Cooperstown, N. Y.
Orville E. Squier		Williams, Cal., and Barlet Springs, California
Nevada-California-Oregon Ry.		Alturas and Eagleville, Cal.
Chester Francis Massie		Pasadena to Millard Canyon, Cal.
John W. Martin		Hollywood to Culver City, Cal.
John R. Scanlon	Ogdensburg, N. Y.	Ogdensburg to Richville, N. Y.
A. B. Forrest	Healdsburg	Healdsburg to Geysere, Cal.
Philip Panella	Inlet, N. Y.	Utica, N. Y. to Inlet
Utica-Old Forge Transportation Co., Inc.	Utica, N. Y.	Utica to Lowville, N. Y.
George Thayer	Rome, N. Y.	Rome-Westdale to Williamstown
H. M. Parks	Rome, N. Y.	Rome to Williamstown, N. Y.
Stephen Reed	Rome, N. Y.	Rome to Williamstown, N. Y.
V. K. Irion	8013 Poplar St., New Orleans, La.	Inter-city Systems, New Orleans Louisiana
The West Penn-Manon-Gahelia Public Service Co.	Wheeling, W. Va.	Wheeling, W. Va.
<b>Lines Proposed</b>		
New York State Railways Co.	Rochester, N. Y.	Rochester to Schenectady, N. Y.
ordinated Bus Lines	Middletown, N. Y.	Lines inside city
Wallkill Transit Company	Clayton, N. Y.	Watertown to Cape Vincent, N. Y.
C. Cameron Frozer	Manitowac, Wis.	Sheboygan and Manitowac, Wis.
Anson Hauser	Butler, Mo.	Butler and Harrisonville, Mo.
Interstate Motor Transit Company	Dixon, Ky.	Evansville, Ind. to Henderson, Ky.
E. F. Winstead	Asheville, N. C.	Charlotte and Asheville, N. C.
Kendworth Transportation Co.	Canton, N. Y.	Canton to Waddington, N. Y.
Stanley Corneil	Madison, Wis.	Cross Plains to Prairie du Lac, Wis.
The Ward Bus Co.	Louisville, Ky.	Louisville to Camp Taylor, Ky.
Camp Taylor Civic Club	Fond du Lac, Wis.	Fond du Lac and Neenah, Wis.
Eastern Wisconsin Elec. Co.	1203 West Wood St., Decatur, Ill.	Decatur to Hume, Ill.
A. D. Fletcher		
Gadbury Motor Bus Transportation Company	Joliet, Ill.	Joliet and Wilmington, Ill.
George W. Layne	Danville, Ill.	Decatur and Pana, Ill.
Louisville-Lexington Bus Co.	Louisville, Ky.	Lexington to Louisville, Ky.
J. J. O'Connor and E. J. Murphy	East Taunton, Mass.	Taunton Green and Elliott's Corner, Mass.
Poconantas Transportation Co.	Poconantas, Va.	Montcalm to Poconantas
<b>Permits Granted</b>		
Charles H. Wooley	Buffalo, N. Y.	Niagara St. to City Line, Buffalo, New York
Cecil Farrell	Castle Creek, N. Y.	Cortland to Binghamton, N. Y.
H. M. Parks	Rome, N. Y.	Rome to Camden
Port Arthur-Port Neches Bus Line	Port Arthur, Texas	Port Arthur and Port Neches, Tex.
Interstate Bus Line Company	Wilmington, Del.	Wilmington to Chestertown, Md.
Earnest J. Ritch & Edward J. Wortman	Kingston, N. Y.	Kingston to Sawkill, N. Y.
N. T. Gaffeller	East Berlin, Pa.	Gettysburg to Hanover, Pa.
Interstate Bus Line (Note 1)	Wilmington, Del.	Elkton and Delaware State Line
V. V. Bullers and E. W. Speers	Salt Lake City, Utah	Salt Lake City and Garfield, Utah
Charles Phillips	Little Falls, N. Y.	Little Falls, N. Y., Richfield Springs and Cooperstown, N. Y.
James R. Scanlon	Hammond, N. Y.	Ogdensburg to Gouverneur, N. Y.
Austin Brothers Transfer Company	St. Louis, Mo.	Marion to Centralia, Ill.
The Finot Bus Lines, Inc.		St. Louis, Mo. and Fenton, Mo.
C. E. Whipple		Sonoma and Cow Creek, Cal.
Madera Yosemite Big Trees Auto Company		Merced to Yosemite Valley, Cal.
J. A. Smith		Harbor City and San Pedro, Cal.
Pacific Electric Railway	Los Angeles, Cal.	Los Angeles to Maywood Tract
Emil J. Kleinsmith		Santa Monica and Los Floris Canyon, Cal.
W. D. Alexander, Carson-Tahoe Transportation Co.		Lakeside and Homewood, Cal.
David Drake		Blue Nose, Cal., and Happy Camp
Bus Transportation Co.	Wheeling, W. Va.	Local service in Wheeling

Note 1—Formerly operated by Gus Paulos, Chas. Paulos, Gus Markis.  
Note 2—Line to be started if E. R. R. discontinues route.

for three buses to be operated on a regular schedule between Springfield and Pittsfield. The City Council will renew the licenses of twenty-nine jitney operators who have given service during the past year.

The Springfield Street Railway has bought from Clarence Goodman, president of the Motor Bus Owners' Association in Springfield, Mass., his new Stewart bus, ordered for use on an independent line, and has engaged Mr. Goodman to operate it for the railway company. This comes as a new development in the plan of Mayor Leonard of Springfield to retire all independent buses in the near future and depend on the railway for complete transportation service (see BUS TRANSPORTATION for March, 1923).

### Concourse Bus Line, Stopped by Injunction, to Resume

A franchise was granted on April 20 by Mayor Hylan and the Board of Estimate of New York to the Grand Concourse Bus Company for the operation of a bus line between Harlem and the Bronx only. It was feared that a technicality which was discovered might lay the franchise open to an injunction by interests hostile to the Hylan administration, but the Mayor insisted upon going ahead.

The franchise extends over a period of three months with a clause permitting revocation in thirty days. It calls for a 5-cent fare and 5 per cent of the gross receipts, with the minimum amount of \$5,000 for the entire period as the city's share. To circumvent any transference of control to any other company, Emil Leindorf, the president of the bus company, had to deposit his capital stock with the Comptroller.

The Transit Commission has set May 2 as the date for a public hearing on the bus company's application for a certificate of convenience and necessity. This must be granted before the buses can be legally operated and it is understood that it will be granted to relieve the people of the Bronx from their present transit inconvenience.

One bus line runs from 110th Street and Fifth Avenue, over the Madison Avenue bridge and up the Grand Concourse to Moshulu Parkway. The other route runs from 150th Street and Melrose Avenue up the concourse to the parkway.

### Boston Elevated Operating Four Bus Lines

Four regular bus lines are now in operation or immediate contemplation by the Boston (Mass.) Elevated Railway supplementing its trolley service. The company has now established a full service between Linden and Malden Square operating four buses. The company has one line in North Beacon Street, another in Highland Avenue, Malden. It will start a fourth line on May 1 in Riverside Avenue from Fells-

way to Medford Square, on the Wellington district. A fifth line, under discussion, from Medford Square to Medford Hillside.

For the four lines already operating or definitely decided upon the company has seventeen buses. It will extend this service as the demand develops if it obtains permission from the city authorities. The company has a blank permit from the State Department of Public Utilities, but must have been given the local authorities for each specific route.



## Financial Section

### 57 per Cent Increase in Bus Traffic in Detroit

At the time the annual report of the Detroit (Mich.) Motorbus Company was presented to the company's stockholders recently eighty-one buses were in operation, with seven more in the course of construction and about ready for delivery. The new covered upper deck buses have been found very popular in both summer and winter and have proved to be a source of increased revenue to the company.

Increased demands made upon the company for transportation necessitated supplying additional equipment and the purchase of forty more buses has been authorized by the directors. According to the report, the motor bus company carried in 1922 more than 14,000,000 passengers, representing an increase of 57 per cent over the 1921 figures. This increased traffic was carried with an increase of 42 per cent in equipment.

For the year 1922, 329,571 trips were reported, as against 224,571 trips in 1921. The mileage traveled in 1922 was 3,617,946, as compared with 2,489,571 in the preceding year.

Current assets were given as \$201,781, with current liabilities at \$69,842. Included in the current assets are \$80,248 in Government securities and \$69,609 in cash. Total assets were given at \$1,232,263. Of the \$205,167 depreciation reserve, \$196,985 was charged to depreciation on equipment. Surplus amounted to \$67,820. No earnings statement was included in the report.

### Columbia River Stage Line Highly Profitable

A hearing was recently instituted in Portland, Ore., by the Public Service Commission to inquire into the rates, schedules and practices of stage lines operating on the lower Columbia River Highway. This is the first real study of the cost of automobile service ever made in Oregon by any official body.

The hearing disclosed that a profit of 17.5 per cent net was made on last year's operations of the Columbia River stages. The stages are operated by A.

Lauch, who has been operating since 1912, and by the Columbia River Highway Stage Line, which was organized in 1917. The latter company has been operating since 1917.

The stage line reported that the Columbia Stage Line, which is the largest of the two companies, has a net profit of \$250,000 a year. The stage line is now operating on a regular basis, and the competition indicates the extent of the competition that the stage line offers the railroads.

H. D. Wagner, Jr., president of the condition of the stage line operated by the Columbia Stage Line and the Road Blue Line, and declared that the stage line's business was good.

It is considered probable that the stage line will take the business in hand and reorganize them, as there is now a spread of from 1.5 to 5 cents per mile in the charge being made for bus fare. The commission is engaged into the question of the effect of the subsidy afforded by the state department of A. Lauch.

### Public Permitted to Subscribe

The Jefferson Highway Transportation Company, Inc., Phoenix Building, Minneapolis, Minn., has accepted the Class A participating stock at \$100 per share, paying 7 per cent with the right to participate in a dividend of 10 per cent profits earned during the year. The amount by the company. The shares will be issued to 3000 subscribers, one to three shares each. There are no bonds outstanding. The net earnings for the year ended April 30, 1923, will be \$50,000.

The company has been operating 16 lines, three buses operating to St. Paul, Minn., the Motor Trail, the stage line operating to Fargo, Minn., and other buses, and a bus line operating to Duluth, Minn., and Grand Rapids, Minn., one bus. It now needs more capital and will use the proceeds of the stock sale for the extension.

The company was organized in the spring of 1920. In the year 1922 it carried 200,000 passengers. The company's motor bus operating on the lower Columbia River have increased to \$97,781. Fifty towns within 150 miles of Minneapolis are reached daily by the company's service. The company has a large garage and a number of cars for sale. The company is now operating a twenty-four hour service on the lower Columbia River.

In a full-page advertisement which appeared in the Minneapolis Journal on April 19 the company stated:

"The Jefferson Highway Transportation Company, operating through the state of Minnesota a large fleet of highway buses, want to find out if the company wishes to enlarge a business already amazing, by establishing good will in Minneapolis and other communities it serves. For that reason, and for that reason, primarily, the company will permit a limited number (3000) to become shareholders, with the opportunity of participating in big profits."

# Bus Regulation



## Unreasonable Iowa Ordinance Overruled

Cities of Iowa can no longer pass prohibitive and unreasonable ordinances designed to eliminate motor buses from their streets. This is the substance of a ruling made recently by the Supreme Court of the state. The decision was rendered in a case brought up from Mason City, where the City Council had passed an ordinance fixing a license fee of \$300 per annum and requiring a bond of \$50,000 for each bus carrying ten or more passengers.

The Star Transportation Company, which operates buses out of Mason City, held that such an ordinance was prohibitive and unreasonable and defended its stand in the high court. The ordinance in question further prohibited the buses from operating over streets occupied by an electric railway.

The Star Transportation Company operates four twenty-passenger buses connecting Mason City, Garner and Hampton. When the objectionable ordinance was passed the bus company successfully brought an injunction suit in the District Court of Cerro Gordo County. This action was appealed to the Supreme Court by the city. The court's ruling was based almost solely on the ordinance being "prohibitive and unreasonable."

## Important Minnesota Bill Lost in Legislature

The Minnesota Legislature has ended its biennial session without passing the special bus control bill that the organized bus owners desired to have made a law. The Legislature did, however, change the state motor car registration law so as to make the annual fees more equitable with respect to the basis of the tax. Among the other measures that failed was a \$20,000,000 bond issue bill to enable the highway commissioner to do work in 1924 that would ordinarily take ten years. It is suspected the railroads had something to do with the fatality of this measure, as the general public favored the passage of the bill.

Notwithstanding the showing by the bus men that a 10 per cent tax on commercial and freight vehicles could not be borne by them, although they believed they could pay a minimum of \$250 a car and a maximum of 5½ per cent of the valuation, the tax was put at 10 per cent ad valorem as of Nov. 1 of the previous year, with the usual 10 per cent depreciation. The bus men held that buses were paying 25 per cent more than trucks, which under the bill would pay taxes ranging from \$12 to \$200, according to size and weight.

## Ohio Regulatory Bill a Law

Both the House and the State Senate of Ohio passed the bill putting buses under control of the Public Utilities Commission and levying taxes upon them for the upkeep of highways. The bill became a law without the signature of the Governor. It becomes effective in ninety days.

The bill empowers the Public Utilities Commission to supervise and regulate all motor bus companies, fix their rates, regulate the service and safety of operation, require filing of annual reports and provide uniform accounting systems. The commission is to have authority over the bus companies to the exclusion of local communities.

Existing motor transportation companies are protected from competition by new companies by reason of a provision which makes it necessary for any new bus company to obtain a certificate of convenience and necessity from the Public Utilities Commission before beginning to operate.

The bill provides the following schedule of taxes for bus lines, to pay expenses of administration and to maintain and repair highways:

1. For cars operating between fixed termini—For seven-passenger cars, \$50 each; cars carrying twelve to eighteen, \$140; cars carrying eighteen to twenty-four, \$180; cars carrying more than twenty-four, \$280.
2. For cars not operating between fixed termini—For seven-passenger cars, \$25; cars carrying seven to twelve, \$60; cars carrying twelve to eighteen, \$90; cars carrying eighteen to twenty-four, \$115; cars carrying more than twenty-four, \$150.

Fifty per cent of the taxes collected go to the state to the credit of the highway maintenance and repair fund, while the Treasurer of the state is authorized to apportion 50 per cent in accordance with the lineal miles of route in each municipality and county.

There are stringent provisions covering qualifications of drivers and fixing penalties for not keeping within the terms of the orders of the commission fixing schedules, etc.

The schedule setting forth the amount of the bond that must be furnished, or the insurance carried, is as follows:

For each motor vehicle used for transportation of property or for transportation of persons or both, the seating capacity of which is seven passengers or less, for any recovery for personal injury to or death of one person not less than \$5,000; for any recovery for personal injury to or death of more than one person in any one accident, not less than \$10,000, and for any recovery for damages to property of any person other than the assured not less than \$1,000.

For each public motor vehicle used for the transportation of persons the seating capacity of which is eight to twenty passengers, inclusive, for any recovery for personal injury to or death of one person, not less than \$5,000; for any recovery for personal injury to or death of more than one person in any one accident not less than \$12,000, and for recovery for damage to property of any person other than the assured not less than \$1,000.

For each public motor vehicle used for transportation of persons the seating capacity of which is more than twenty passengers, for any recovery for personal injury to or death of one person not less than \$5,000; for any recovery for personal injury to or death of more than one person in any one accident not less than \$15,000, and for any recovery for damage to property of any one person other than the assured not less than \$1,000.

Before the bill embodying the provisions becomes a law, there will have

to be a conference on it between the House and Senate. The taxes enumerated above are those in the Senate bill. As the bill passed the House the taxes are a trifle lower because at the time the House passed the bill it was expected that there would be a gasoline tax of either 1 or 2 cents a gallon in Ohio. This measure, however, has already been defeated and for that reason the rates for motor buses have been increased in the Senate bill.

## Rights of Call and Demand Operators Defined

The Public Service Commission of Pennsylvania has gone on record as defining the rights and privileges of automobiles and motor buses holding certificates as common carriers and those holding call and demand certificates. The decision was rendered in the case of the complaint filed by the Emerick Motor Bus Company, Bellefonte, against Harry Roan, Charles Tressler, Percival Rudy and Harry Resides, who operate call and demand taxicab service in State College and vicinity.

The complaint in the case charged these men with improper conduct and alleged that they were operating contrary to the rules and regulations of the Public Service Commission, in that they were in the habit of coming to Bellefonte, parking their cars about the Pennsylvania Railroad station and carrying passengers in competition with the Emerick Motor Company bus line on its regular schedule, and soliciting passengers contrary to the regulations of the commission.

In the order the commission directs that Roan, Tressler, Rudy and Resides cease and desist from operating motor vehicles as common carriers for the transportation of passengers between the borough of State College and the borough of Bellefonte; providing, however, that the restraining order shall not apply when said respondents, or any of them, are specially engaged to transport passengers from State College to Bellefonte, and shall not apply when said respondents, or any of them, are specially called to Bellefonte to transport particular passengers from Bellefonte to State College.

The order further directs that the State College taxicab men shall cease parking their cars at the Pennsylvania Railroad depot or other places in the borough of Bellefonte, and prohibits them from soliciting persons for transportation as common carriers.

In its decision the commission stated that the call and demand certificates were issued for State College and vicinity and did not contemplate the carrying on of such a business in the borough of Bellefonte, which would be in direct competition with those persons who hold call and demand certificates for Bellefonte and vicinity. The commission states that unless such rules and regulations are prescribed endless confusion would result.

# Personal Notes

## Major McKay Manager

Sketch of Head of First Sizable City in Which Bus Has Replaced Local Electric Railway

**MAJOR WILLIAM JOHNSTON McKAY**, manager of the city of Newburgh, N. Y., under Plan C, commission form of government, is a staunch believer in bus transportation. The proud distinction is his of being the head of the government of the first city of any considerable size in the United States to go over from electric railway entirely to bus operation conducted in an orderly way by a stable management. Under Major McKay buses have always been as welcome in Newburgh as are the flowers in May. As he put it some time ago:

### DON'T TRY TO GUM PROGRESS

"The man or men who reckon to fight the bus business when it is properly conducted are doing an unwise thing. They are trying to gum progress. The bus business is no longer an infant industry. It is fast reaching the proportions of a swaggering giant. We like giants in Newburgh. The more of them the better we will like it."

The Major was born in Newburgh on June 10, 1866. He was educated in the public schools, and at the age of twelve went to work in the Newburgh Steam Cotton Mills, where he remained for two years. From this he took what he terms as a "a whirl" at the dry goods business, at which he remained for five years. Wishing to see "what made the wheels go round" he went to New York City, where he was employed "selling shoes" for three years.

At the age of twenty-two he decided that Newburgh had it on New York City as a "place to grow up in." He returned and entered a real estate office, where he learned that business from the "middle both ways." In 1894 he went into the real estate and insurance business for himself, and was successful from the start. He mixed humor with his business; when a building lot buyer wanted to know "how deep" the lot was, Mr. McKay would remark that he wasn't sure, "nobody having dug into it as yet," but that "the official survey showed it to be 100 ft. long on the surface." Major McKay is engaged in this business yet.

### MADE PRISON ADMINISTRATOR

In the year 1909 Governor Hughes appointed him to the post of Commissioner of New Prisons. He begat himself a reputation while serving in this capacity, because of the fact that grafters could never get to him. He insisted that a cubic foot measure a

toot each way. When buying building sand he used to insist on it being weighed only once, and charged similarly. In 1911 he was appointed a member of the Hudson-Fulton Celebration Commission by Governor Dix. In February, 1917, he enlisted and was appointed a captain in the Quartermaster Corps of the United States Army. On Aug. 10, 1917, he was ordered to report to the Embarkation Officer at Hoboken, N. J., for service overseas. He went across and reported personally to General Pershing at his headquarters in Paris.

### IN SERVICE ABROAD

Major McKay served four months in the Quartermaster's Department and was transferred to the Engineering



W. J. McKay

Corps, Army Transportation Section. He was stationed at Base Section No. 4, with headquarters at Havre, from November, 1917, to December, 1918. He was next promoted to Major in the Engineering Corps, and received two citations from the commanding officer, General Pershing, of the A.E.F. for "exceptional, meritorious and conspicuous service." He was honorably discharged in January, 1919, and returned to his business. He was appointed city manager of Newburgh on Jan. 5, 1920. He has held the office longer than any other city manager.

### LIKELY TO KEEP HIS JOB

Major McKay is a born diplomat, with a weird method of knowing just when and how to say "yes" or "no." He is anxious to resign and devote himself to his own business, but the commissioners and the Mayor of the city of Newburgh have put it up to him to find another city manager "just as efficient as the present incumbent and we will accept your resignation."

## Mr. Mullahey Made Superintendent

Former District Superintendent Succeeds Mr. Moser with Fifth Avenue Coach Company—Other Organization Changes

**JOSEPH W. MULLAHEY**, who has been identified with transportation in New York City since 1908, succeeded Herbert C. Moser as superintendent of transportation of the Fifth Avenue Coach Company.

Mr. Mullahey entered the field of transportation as a conductor on the Lexington Avenue line of the old Metropolitan Street Railway. During the four years he was with this concern he was successively a conductor, clerk, motorman, starter, inspector, and for a time served in the carhouse working on motors, controllers and air brakes. He joined the Fifth Avenue Coach Company in August, 1912, as a starter and was made a supervisor the following November. The first time-table put in force by the company was prepared jointly by Mr. Mullahey and Mr. Moser. Mr. Mullahey was transportation superintendent of the eastern division when he was selected as Mr. Moser's successor.

The construction and overhaul departments of the company, which came under the direction of Edward Wotton, who also resigned to join Mr. Moser in Chicago, have been reorganized and divided into three separate departments with a superintendent at the head of each. Under this reorganization Matthew Watson has been made superintendent of rolling stock; Joseph Richardson, superintendent of the machine shops, and Michael Forrester, superintendent of the carpenter shop.

Matthew Watson entered the field of steam transportation in Kings Lynn, England, in 1897. In 1906 he entered the employ of the Wolsley Tool & Motor Company in Birmingham, which at that time was the largest automobile factory in Great Britain.

In 1910 Mr. Watson came to this country and joined the Fifth Avenue company as a mechanic. He later was placed in charge of the engine bench and from that post was advanced to the position of foreman of the overhaul shops by G. A. Green, then general manager of the New York Transportation Company, which was operating taxicabs. Since 1912 Mr. Watson has acted as foreman of the mechanical departments and for a time aided the research department in carrying out experiments. In 1922 he helped install the motor coach system of the Milwaukee Electric Railway & Light Company, and last winter installed a bus system at Newburgh, N. Y. Mr. Watson, as a guest of the London General Omnibus Company, visited that company's plants and made a study of its manufacturing methods.

Joseph Richardson started in the company as a foreman under Mr. Wot-

ton. He was placed in charge of the mechanical department when Mr. Wotton was transferred to the New York Transportation Company. To Mr. Richardson falls the honor of having superintended the construction of every motor coach produced by the company. In his new rôle of superintendent of the mechanical shops the assembling of all the chassis will come under his direction, as well as the annual overhaul work.

Michael Forrester is the pioneer motor coach body builder of America and designed the first bodies used by the Fifth Avenue company. He entered the employ of the company in May, 1905. The first De Dion-Bouton buses brought to this country in 1914 were used by Mr. Forrester as the basis for subsequent designs in which he increased the seating capacity from thirty-four to forty-four, then to forty-seven and finally to fifty-one, the present capacity of the L type Fifth Avenue motor coach.

The post made vacant by the elevation of Mr. Mullahey to the superintendency of transportation has been filled by the appointment of Herbert A. Keirstead, who joined the company on Oct. 6, 1909, as a conductor.

### Highway Commission Appointments Announced

Recent appointments on state highway commissions are as follows:

Massachusetts—William F. Williams, Commissioner of Public Works; A. W. Dean, chief engineer.

New York—Frederick Stuart Greene, Commissioner of Highways; William A. Patton, secretary to the commission.

Pennsylvania—Paul D. Wright, State Highway Commissioner; William H. Connel, Assistant Commissioner.

New Jersey—Gen. H. L. Scott, chairman Highway Commission; E. E. Reed, acting state highway engineer.

Tennessee—J. D. Creveling, Jr., chairman Department of Highways; Major D. Q. McComb, chief engineer (reappointed).

Oklahoma—Paul Nesbitt, Commissioner of Highways; F. G. Simmonds, state engineer.

Kansas—Gov. J. M. Davis, chairman Highway Board; L. R. Tillotson, highway engineer.

Nebraska—Ray Cochran, Secretary Department of Public Works; M. C. Noble, chief of the Bureau of Roads.

North Dakota—R. A. Nestos, chairman Highway Commission; Walter G. Black, chief engineer.

New Mexico—James A. French, Highway Engineer.

Arizona—F. R. Goodman, State Engineer.

California—Harvey M. Toy, Chief Department of Public Works; Robert M. Morton, Director Division of Public Works.

Oregon—Roy A. Klein, Highway Engineer.

Idaho—William J. Hall, Director Public Works.

## Young Lady Proprietor

Red Ball Transportation Company of Mason City, Iowa, Is Headed by Progressive Young Woman

OUT in Iowa there is a young woman upon whom devolves the main responsibility of operating a bus line. She is Helen M. Schultz. She and her brother, Magnus J., are the proprietors of the Red Ball Transportation Company, Mason City, but it is Helen who is at the business end. She takes care of the office, sees to the bookkeeping, hires and discharges the drivers and oversees the routes. The brother has charge of the mechanical end of the business.

Helen Schultz is only twenty-four years old, but she is made of stern stuff. Miss Schultz read William James when she was in High School in Shell Lake, Wis., and then and there resolved to take the philosopher's advice and always remain young mentally. She is not afraid of a new idea. Neither is



Helen M. Schultz

there an inferiority complex anywhere in her makeup. She has on occasion defied the police in the operation of her line, but her defiance was not mere bravado. It was based on her conviction that her point of view with respect to her operating rights was correct, and the court has upheld her in her contention, both the District Court and the Iowa Supreme Court. This is, of course, a happy result, but it was not achieved until after Miss Schultz had gone through a peck of trouble, which involved even her arrest. Her attitude is that she is willing to pay a tax and that the operators of buses should be taxed, but it is not her idea that each city or town through which she operates should have the right to exact whatever charge it saw fit.

So much for that phase of the story. Helen Schultz and her brother started bus operation on April 1, 1922. They entered the business with one White bus in service between Charles City and Waverly over a dirt road. Three months later the route was extended to Waterloo, Iowa, and on Sept. 1 they began operating west from Charles City to Mason City and thence to Algona,

Iowa. From this modest beginning the business has been extended until now the Red Ball Transportation Company, Inc., headed by Miss Schultz, has the longest route in the State, covers the greatest number of miles in the State and has a fleet of buses which for its accommodations is probably better than that in service on any other line in the State. Twenty-one towns are touched by the lines.

The present equipment consists of four Packard buses each of 15-passenger seating capacity and two White buses each of 18-passenger seating capacity. These machines cover on an average 1,030 miles a day and as many as 1,048 passengers have been handled in a day. The weather has been rough at times during the past winter, but the cars of the bus line got through snow banks several times when touring cars didn't. Twice during the month of March this year, however, the bus line was unable to operate, but at these times trains were also unable to make their way through the drifts for two or three days.

Miss Schultz has driven when the necessity arose, but she does not make it a practice. She has in her employ at present seven drivers and two mechanics. One of her big problems has been to get reliable drivers. She favors married men for the job. Her complaint against the young unmarried men is that they are for the most part drifters.

Miss Schultz became imbued with the idea of entering the bus game while she was traveling in California. She toured that State and some of the Southern States in 1921 and returned home filled with the possibility of applying the bus idea in Iowa. The transportation business was not entirely new to her, however, for after she had been graduated from the high school at Shell Lake and had attended business college at Duluth Miss Schultz was employed for some time in accounting work with one of the western steam railroads.

One of the new buses, named Miss Iowa, cost the Red Ball Transportation Company, Inc., \$11,000, and it is quite certain that Miss Schultz may be depended upon so to keep her accounts that she will know from month to month just what the monetary return is from this and her other investments. Miss Schultz may not be the only woman proprietor of a bus line in the United States, but Iowa may, indeed, justly feel proud of a young woman who in such a short time has made herself a real factor in the life of the local community.

Major Mark L. Ireland, U. S. A., has been appointed Roy D. Chapin Fellow in Highway Transport by the Board of Regents of the University of Michigan. Major Ireland gained eminence during the recent war as post commander at Fort Sam Houston, Tex., and later as an officer of the Motor Transport Corps in France.



# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



Market conditions  
affecting the bus  
industry.  
Price changes in  
important  
commodities.

## Tire Changes Impending

Manufacturers Are Surveying the Industry with the Idea of Fitting Tires to New Requirements

FRANK A. SEIBERLING, president of the Seiberling Rubber Company, has issued a review of tire sizes during the past ten years. He expresses the opinion that both bus and other automobile wheel diameters are due to become still smaller and that at the same time the cross section of bus tires will become greater. One of the tendencies in the tire business is toward a decrease in the number of plies of fabric in the tire. According to Mr. Seiberling, it is not unlikely that six plies of fabric will in the future be used in tires where eight are now used, and that four may be used where six are the rule at the present time.

The so-called small diameter tire, known also as the "balloon or doughnut" tire, has recently gained favor with bus manufacturers. This has led to reviews of tire sizes by other manufacturers than Mr. Seiberling. It is pointed out in these reviews that ten years ago wheels were much larger than they are at the present time. Even on the so-called bus sizes the early tires were from 4 in. to 6 in. larger in diameter than are similar tires at present. Thus the tendency in automotive engineering has been to bring the center of gravity of motor vehicles closer to the ground by decreasing tire diameters. In the opinion of some of the foremost engineers, this movement will be accelerated in the future. This, of course, would not be possible except for the development of the highway. With improved highways, vehicle bodies can with safety be brought closer to the ground than during the early days of the industry, when mud roads were the rule rather than the exception.

The subject of a possible change in tire sizes is, of course, a highly important one to the bus industry. A point brought up by some manufacturers regarding the smaller diameter tire is that the gas consumption will be somewhat larger with the smaller diameter tires than with the present tires for 24-in. wheels. Offsetting this in a measure is the smaller cost of the tires in the reduced sizes.

The construction of tires to meet the new bus requirements is a subject which automobile and bus tire engineers are studying closely. Thus the Mason Tire & Rubber Company during the past three months has tested under the hardest possible road conditions a

new bus tire which will, according to Mason officials easily give 12,000 miles of service. The complete details of the new tire are not yet known, but it is known that one of the features of the new casing is the running of tread stock over the entire tire. This decreases the possibilities of side wall abrasion.

It is estimated by some authorities in Akron that the 1923 bus tire consumption will exceed the 1,000,000 mark for the first time in the history of the industry. This estimate is based on unofficial reports that there are at least 60,000 buses now in operation as compared with 40,000 a year ago, and that the average bus will consume between four and five sets of tires a year.

The tire industry is operating at peak, but the rate of operation is believed to be somewhat too high. Any curtailment in production within the next month or so will probably not be violent, and if sales continue as at present, the plants may be expected to keep going ahead at the present rate of production. This development dismisses definitely the fears expressed earlier in the year of a possible shortage of tires.

The Firestone Tire & Rubber Company is increasing tire prices May 1 in conformity with increases announced during March by many other makers. At the time this account was written the amount of the increase by Firestone had not been announced. It was expected, however, that it would be 10 per cent. This was the extent of the general increase in price made recently in the industry.

## Gasoline Prices—April 26, 1923

City	Gasoline per Gal. Tank Wagon	Service Station
Albany, N. Y.	24.5	26.5
Atlanta, Ga.	23	25
Boston, Mass.	23.5	26
Chicago, Ill.	20	22
Cincinnati, O.	21	23
Detroit, Mich.	21.4	23.4
Fort Worth, Tex.	20	23
Indianapolis, Ind.	20.8	22.8
Jacksonville, Fla.	21	23
Kansas City, Mo.	15.5	17.5
Louisville, Ky.	22	24
Memphis, Tenn.	19	21
Milwaukee, Wis.	20.6	23.6
Mobile, Ala.	24	26
Newark, N. J.	24	26
New Haven, Conn.	24.5	27
New Orleans, La.	21.5	23.5
New York, N. Y.	24.5	26.5
Okla. City, Okla.	20	23
Omaha, Neb.	20.25	22.25
Philadelphia, Pa.	23	26
Pittsburgh, Pa.	23	26
Richmond, Va.	23	25
St. Louis, Mo.	20.5	22.5
St. Paul, Minn.	20.7	22.7
Salt Lake City, Utah	25.5	27.5
San Francisco, Calif.	16	19
Seattle, Wash.	18	21
Spokane, Wash.	21.5	24.5
Washington, D. C.	25	27

In Bus Tire Operations. In April the statement was made that "The Miller Rubber Company is making effort to get away from automobile makers' original concern for bus tires." The company, at the statement, was in error. It is not to get away from original concern for bus tires.

## To Finance Motor Bus Transactions

The National Commercial Credit Corporation of Cleveland Is a Pioneer in Specialized Field

WITH a view to meeting the portion of the capital required for motor bus operation, the National Commercial Credit Corporation of Cleveland, Ohio, a \$2,500,000 corporation, was recently organized. The company will specialize in motor bus operation and in the extension of credit to bus operators operating in Ohio and adjacent states for the purpose of adding to or improving their equipment. The company is working in harmony with motor bus operators and the state commissions with a view to bettering operating conditions and toward making bus transportation one of maximum safety and convenience.

"We believe," said Don B. McMullen, president of the company, "that in working in every possible way with the operators on the one hand and the authorities on the other, we are in reality making more business for ourselves. The more popular the bus becomes with the public, the greater the total volume of bus business that will be done. We frankly hope for our share. The industry, big though it is, is young yet and co-operation must be the order of the day."

The capital requirements of the corporation are covered by an 8 per cent gold note issue which has been underwritten by Shifflet, Cumber & Company, bankers, Detroit and New York.

The officers of the company are Don B. McMullen, president; William J. Pinkett, vice-president; R. H. Norris, secretary, and John L. Dease, treasurer.

## New Body Concern Formed

The Springfield Body Corporation, recently organized under the laws of the state of New Jersey, will take over the business and assets of the Smith-Springfield Body Corporation of Springfield, Mass.

In addition to the operation of the Springfield plant, additional factories have been purchased and will soon be in operation at Patuxent, Md., and Roseland, N. J. It is said that the annual yearly output of these plants will reach 15,000 bodies.

The officers of the new company include G. S. Dams, president; A. H. Wolfe, vice-president, and Frank M. Livingston, controller.

### "Making One Thing Better"

The Federal Motor Truck Company, Detroit, Mich., in co-operation with twenty-seven manufacturers of parts and equipment for its vehicles, has published an elaborate booklet of forty-eight pages, entitled "Making One Thing Better." This contains a history of road transportation, from the time that packs were carried on men's backs up to the present day. It explains the doctrine of "specialization" by which the facilities and economies of a large number of manufacturers are brought together and made available in one complete motor vehicle. The part and equipment makers that co-operated in bringing out the booklet are each given space to describe their product.

### Editors Entertained by Westinghouse

Holding that the technical papers are the windows through which the public sees what is being accomplished by the larger industrial companies of the country, the Westinghouse Electric & Manufacturing Company on April 23 entertained a group of McGraw-Hill editors at its East Pittsburgh works. The trip was specially arranged to give each editor the opportunity to attain a closer knowledge of manufacturer's problems and accomplishments and to visit with the company's engineers who are handling co-related work. Visits through the shops were arranged so the editors would have an opportunity to see special equipment in course of construction. A luncheon and a dinner afforded further opportunity for the editors and the company engineers to discuss problems of mutual interest.

### Master Trucks Reorganized

The reorganization of the Master Trucks, Inc., Chicago, Ill., has just been completed. The plan adopted included the formation of a new company known as Master Motors Corporation, which has purchased all of the assets and good will of the old company. The new company will have assets of approximately \$800,000, with no liabilities, and will continue operation of the greatly increased business without interruption. No changes will be effected other than those contemplated further to improve the company's product and to increase the large volume of business enjoyed by Master Trucks, Inc., since 1916. The petition filed some time ago against the Master Trucks, Inc., to adjudicate it bankrupt was dismissed, the court finding the company to be solvent.

### Missouri Car Company Will Build Bus Bodies

Plans were made for opening the Missouri Car Company's plant at Twenty-fourth Street and McCasland Avenue, East St. Louis, Mo., on April 15 for the purpose of designing and building auto bus bodies and steel cars. The company maintains general offices

in the Chemical Building, St. Louis, Mo.

The manufacturing plant has an estimated capacity of 600 to 800 street cars annually. It is also planned to make a stock motor bus body, but the facilities of the company will permit the manufacture of a bus body according to any desired pattern.

E. S. Stebbins, the president of the company, will direct the sales organization and handle the financial details for the company. He was formerly Western district manager for a large Cleveland industrial plant. T. A. Brewster is vice-president and chief engineer.

### "Anti-Knock" Gasoline Arrives

The General Motors Corporation, according to newspaper reports, has organized the General Motors Chemical Company, to market through gasoline filling stations, refiners and large distributors of gasoline what is called a modified type of gasoline. This contains an "anti-knock" compound developed by the General Motors Research Corporation, Dayton, Ohio, and referred to in the August, 1922, issue of BUS TRANSPORTATION. It was there stated that the compound is a chemical known as "tetra-ethyl-lead," which can be prepared ready for mixing with ordinary gasoline at a cost of about 1 cent a gallon. The compound, it is said, tends to eliminate the knock, materially improves the performance of the engine and makes for a smoother running engine.

### Rolling Stock

**Canton Bus Line—Pyrites, N. Y.**, is in the market for a used bus body.

**Seven New Buses** are now under construction for the North Shore Line, Waukegan, Ill.

**Eastern Wisconsin Electric Company, Fond du Lac, Wis.**, has announced that five new sedan buses will be purchased.

**Earl Goodrich, Twenty-Ninth and Arkansas, Wichita, Kan.**, is in the market for a bus. He prefers a Winton engine.

**Detroit (Mich.) Motorbus Company** has authorized the purchase of forty additional buses to take care of increased traffic.

**J. W. Blodgett, Watertown, N. Y.**, who operates the Watertown, Smithville and Henderson route, has just purchased a sixteen-passenger bus mounted on a Cadillac chassis.

**Henry Crocker, Manitowoc, Wis.**, has purchased two Reo buses, with all modern equipment, to be used on the new bus line between Appleton and Manitowoc, Wis.

**W. L. Morrison, Somerset, Pa.**, who operates a motor bus line between Somerset and Johnstown via Sitesville, has recently purchased a DeSoto chassis with a Bender de Luxe closed body.

**West Penn-Monongahela Public Service Company, Marietta, Ohio**, proposes to install buses constructed on Pierce-Arrow chassis with Kuhlman bodies.

**Black Diamond Bus Line**, now operating between Bluefield and Welch, W. Va., has purchased five new Reo "Speed Wagon" chassis to be added to its present line of buses.

**Cannon Ball Transportation Company, Portsmouth, Ohio**, has purchased two Cadillacs for use over the new Portsmouth-Ironton line. This company contemplates the purchase of two additional machines in the near future.

**Blue Bus Transfer Company**, which is operating between Decatur and Champaign, Ill., has placed an order for two more buses

of fourteen-passenger capacity which will be operated between Decatur and Shelbyville.

**City of Cincinnati, Ohio**, will receive sealed proposals up to May 14 at the office of the Clerk of the Board of Education for furnishing and delivering 1½ or 2-ton chassis equipped with bus body of sufficient capacity to seat at least thirty children and driver. C. W. Handman is business manager of the Board of Education, School District of Cincinnati.

**Dubuque (Ia.) Electric Company** has purchased three new buses for the Dubuque-East Dubuque line. The bodies of the new buses were made by Graham Brothers, while the chassis were manufactured by Dodge Brothers. As soon as the new buses are placed in service four of the present buses will be sold. The new buses will carry eighteen passengers. They will have a longitudinal seat on one side and cross seats on the other.

### Business Notes

**I. M. Lewis**, formerly president of the Bessemer Motor Truck Company, will be in charge of motor truck sales of the newly organized Bessemer American Motors Corporation.

**Martin-Parry Corporation, York, Pa.**, manufacturer of commercial bodies, announces the appointment of R. P. Henderson as general sales manager, and T. E. Chancellor as assistant general sales manager.

**McQuay-Norris Manufacturing Company, St. Louis, Mo.**, has purchased the plant and property of the Victor Bearings Company, Indianapolis, Ind., thus adding to its line a full list of crankshaft and connecting rod bearings.

**Guy V. Sass and Harold W. Scholt** will take over the New England territory for the distribution and servicing of automobile ignition units for the Splittdorf Electrical Company, Newark, N. J., and will establish headquarters at 52-54 Brookline Avenue, Boston, Mass.

**Prof. W. K. Hatt**, director of the Advisory Board on Highways of the National Research Council, has sailed for Europe to make a study of highway development in several countries there. He will attend the International Road Congress, to be held in Seville in May, and will return to the United States early in June.

**George M. Stadlerman**, for twenty-two years connected with the Goodyear Tire & Rubber Company, Akron, Ohio, as its sales manager, has been named president to succeed president E. G. Wilmer, who became president two years ago during the reorganization. Mr. Wilmer becomes chairman of the board and chairman of the executive committee with offices in New York. He will retain practical supervision over all operations.

**American Insulated Wire & Cable Company, Chicago, Ill.**, is now manufacturing magnet wire, having begun operations on April 1. Its products are sold under the trade name A-1 Magnet Wire and consist of the following: plain enameled; single cotton covered (S C C); double cotton covered (D C C); single cotton enameled (S C E); double cotton enameled (D C E); single silk covered (S S C); double silk covered (D S C); single silk enameled (S S E), and double silk enameled (D S E).

**Miller Rubber Company** stockholders at their annual meeting in Akron, Ohio, March 9, re-elected the present board of directors, also all the officers. According to the annual report, the net sales for the year 1922 were \$24,764,244. Total inventories amounted to \$6,128,071, as compared with \$3,981,922 at the end of the previous year. After an allowance for depreciation, obsolescence and interest charges, the net earnings, before provision for Federal taxes, were \$3,116,607.

### Advertising Literature

**Copper and Brass Research Association, 25 Broadway, New York City**, has issued a 32-page booklet entitled "To Make a Good Car Better." This describes by means of illustrations and text all the parts for which copper, brass and bronze are used on the modern automobile. Particular attention is paid to electrical, cooling, fuel and oil systems, to bushings and bearings, and to hardware, fittings and trim.



# BUS TRANSPORTATION



New York, June, 1923

## A Six-Wheel Stage Is Developed in California

**Better Braking, No Skidding, Wider Tread, More Tire Mileage and Easier Riding Are Advantages Claimed for the Stage with a Four-Wheel Rear End in Service on the California Transit Company's System**

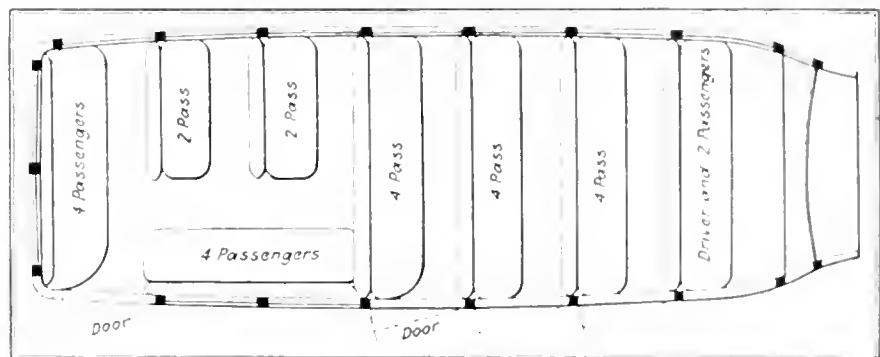
**T**HE first six-wheel stage, built in the California Transit Company's shops according to original designs, was put on a regular run early in April and has since then been in service continually on a schedule that covers approximately 7,500 miles per month. The company has five more cars of the same type under construction in its Oakland shops, and these are all to be in service by July 1. Although it is still too early to give data based on performance over a considerable period of time, the first six-wheeler in its first month of operation did all that its builders expected of it, and no fundamental changes were made in the design of other cars of the same type yet to be constructed.

In addition to the novelty of the rear end, these six-wheelers have several interesting features, notably the arrangement of springs and

bumper on the front ends, the position of steering post, the roof baggage rack, and the single door entrance serving the rear or smoking compartment.

The new stage seats twenty-six passengers and driver, is 27 ft. long from front to rear bumpers, and has a 216-in. wheel base measured from

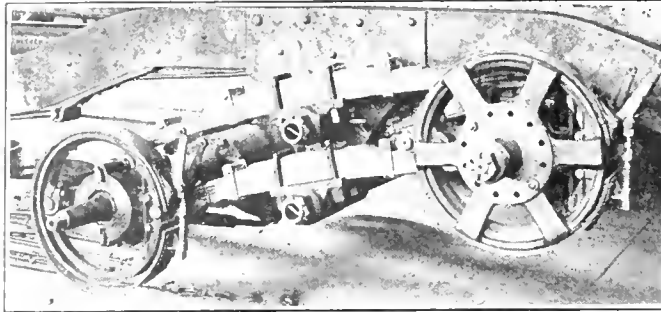
front axle to a point midway between the rear axles. The tread is 68 in. wide, and without load the floor at the front end is 21 in. above the road, and at the rear end it is 21 in. high. The front axle clearance is 9 in. and the lowest point on the motor has an 11-in. clearance. This first stage to be completed has a White



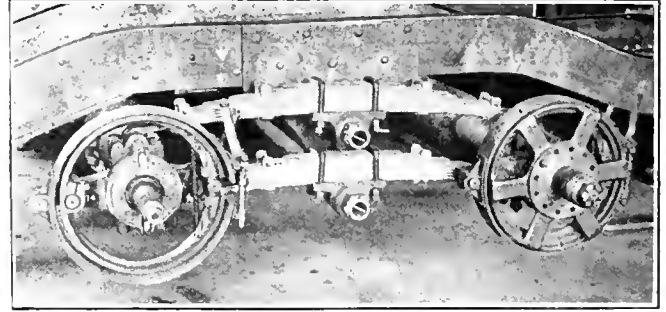
*Sketch showing seating arrangement and doors.*



*The six-wheel stage in service. Note the front bumper, the gasoline filling spout and roof baggage rack.*



*View of rear spring mounting with forward axle swung down to show rotation of springs around the rocker arm shafts*



*Spring mounting with plane of the two rear axles parallel to chassis frame. Note the absence of spring shackles*

Model 50 motor; the tires are 34x5 in., the same size on all six wheels, but on the other five cars it is planned to use the new 32x6-in. tire, which is expected to give the same service with a lower center of gravity.

Only one rear axle, the forward one, carries a differential and hence there are only two drive wheels. These two wheels, including differential, axle housing, brakes, and all other features, are standard in every respect. The second pair of rear wheels are trailers, except that they have a brake equipment duplicating that on the other pair, an equalizer being used to give even distribution of pressure to all four rear wheels.

The novel feature of the rear end, and perhaps its chief advantage, lies in the double support for the springs. As the illustration shows, on each side of the frame the two semi-elliptical springs each rest at the middle point upon a shaft or rocker arm which extends across and through the chassis frame, supporting a spring on either end. With this arrangement the axle carrying the differential is always kept paral-

lel to the car body. This remains true even when a chuck hole or an obstruction drops or raises one wheel as much as 12 in. from the plane of the three others. This is brought about by the arrangement of the two springs free to rotate about the rocker arms.

With this arrangement of springs there are no spring shackles, radius rods or torque arms, thus reducing wear and greasing requirements by a considerable amount. In fact, despite the use of two more wheels and four rocker-arm bearings that a standard rear end would not have, the six-wheeler has no more lubricators on the rear end than the standard stage.

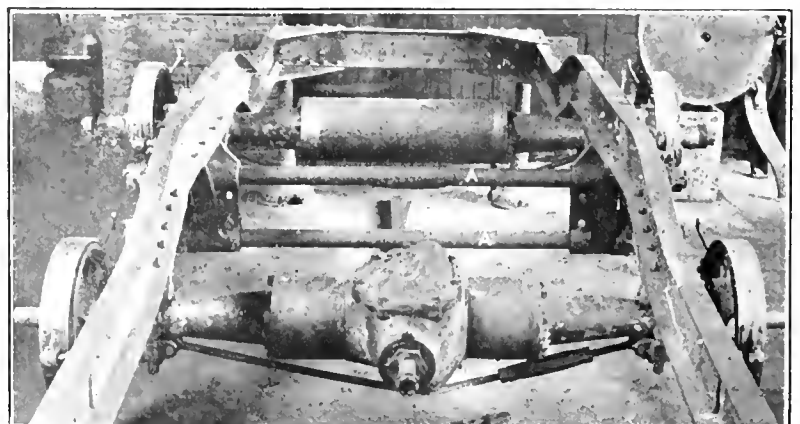
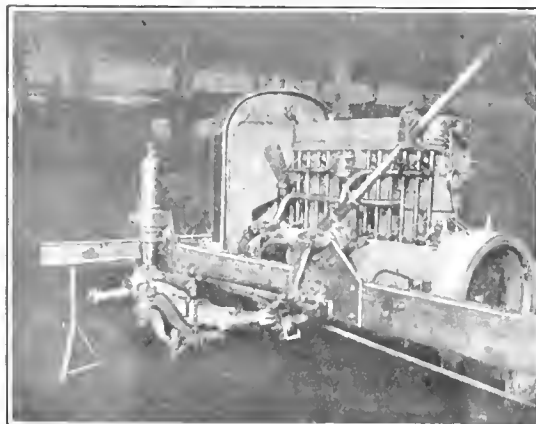
The comparatively large diameter of the cylinder in which the second or trailer axle is housed is due to the desire to use standard differential side brackets. On later buses, with all these parts made especially for the job, this diameter will be considerably less. The trailer axle has standard axle and hub design except that instead of the differential at the center there are two bearings mounted in the center housing to carry the axle shafts.

With this arrangement of the rear end there is twice the braking area afforded by two wheels, the spring arrangement greatly improves the easy riding qualities of the car and there is found to be no tendency to skid when brakes are applied suddenly in wet weather. Considerably

better tire mileage is expected from the wheels mounted tandem than when mounted on the same axle, according to the usual dual tire scheme. With the separate spring connection over each wheel, which the tandem arrangement affords, one wheel does not take the entire weight of the stage as is the case when one tire in a pair of duals goes over an obstruction and raises the other tire off the pavement. Sharply crowned pavements do not affect the loading of tires arranged in tandem, as might be the case with ordinary duals.

The spring mounting on the front end of the chassis is novel in that it gives a simpler and more rugged construction than the standard. These stages with their 216-in. wheelbase, but with the steering rod out of the way of the wheel, can turn in a 69-ft. circle, which is the same space required for turning the standard fourteen-passenger stages with a 180-in. wheelbase. The use of a transverse member of the frame at the front end as a bumper has the advantage that it protects the shock

*Steering post on frame giving straight line steering rod. Note front spring mounted on frame hanger*



*Looking to the rear over the two rear axles. Note the two transverse rocker arms AA on which the springs are supported*

absorbers from collision damage and affords a very desirable forward anchorage for the fenders.

From the photograph it will be noted that the steering post is supported directly on the chassis frame. The steering rod follows a straight line from the steering lever to the front axle and the steering gear construction as a whole is very rugged. This is expected materially to reduce maintenance on this item. Besides the gain in structural strength it puts the driver well over to the left, where he can drive to good advantage, at the same time leaving the maximum amount of room for passengers. The forward end of the front spring is attached to the piston of the shock absorber and the rear end is connected with a hanger which is standard for the front end of the rear springs on a  $\frac{1}{2}$ -ton White.

With the baggage rack on the top of the stage no rear boot is provided. A spare tire is carried on either side of the running board at the forward end, the front fenders being curved on short radius to allow the running board to extend as far forward as possible so as to keep the spare tires well forward. The 30-gal. gasoline tank is mounted on the side of the frame and is filled through a spout just above the running board on the driver's side. On the same side a small box for tools is accessible through a door just above the running board. The battery is also carried on this side supported on the frame under a metal cover.

Behind the driver's seat a sliding partition of wired glass closes off the forward end of the main or ladies' compartment. This compartment in turn is separated from the rear or smoking compartment by a similar partition. Each of the three seats of the forward compartment is separate, entered by its own door. The accompanying plan shows the arrangement of seats.

The facilities of the California Transit Company for construction are such that it was economical to do all the machine and assembly work on the new six-wheelers in the Oakland shops (described in *BUS TRANSPORTATION* for April, 1923, page 167). Frames and bodies are being built there complete, as are also most of the parts that do not require extensive special equipment.

The work is done under the personal supervision of A. T. Shere, superintendent of maintenance, who developed the six-wheel stage designs.

## Hydraulic Brakes Successful on California System

THE Peninsula Rapid Transit Company, which operates a fleet of stages and buses on the 52-mile run between San Francisco and San José, substituted a hydraulic brake for the emergency or hand brake on one of its cars last June. This first installation was by way of experiment, and after running this bus 30,000 miles an order was placed last October for equipping twelve more cars. These have now been in operation several months and W. H. Pearson, president and general manager of the Peninsula Rapid Transit Company, pronounces them an unqualified success.

In selecting a hydraulic brake the requirements laid down by the P.R.T. mechanical department were that the

newed lining the brakes were still going strong. During this service the night schedule on which this bus operated was an "open shift," that is, some thirty or forty drivers operated the car, indicating that no special training or experience is required in order that a driver may use the brake effectively. On other cars of this system, the ordinary requirement has been to renew brake linings every 10,000 miles. No leak or trouble with the hydraulic mechanism has been reported, and the mechanical department states that because of their easy action these brakes do not cause wear or strain on tires or on the mechanism of the car itself.

This brake, its manufacturers



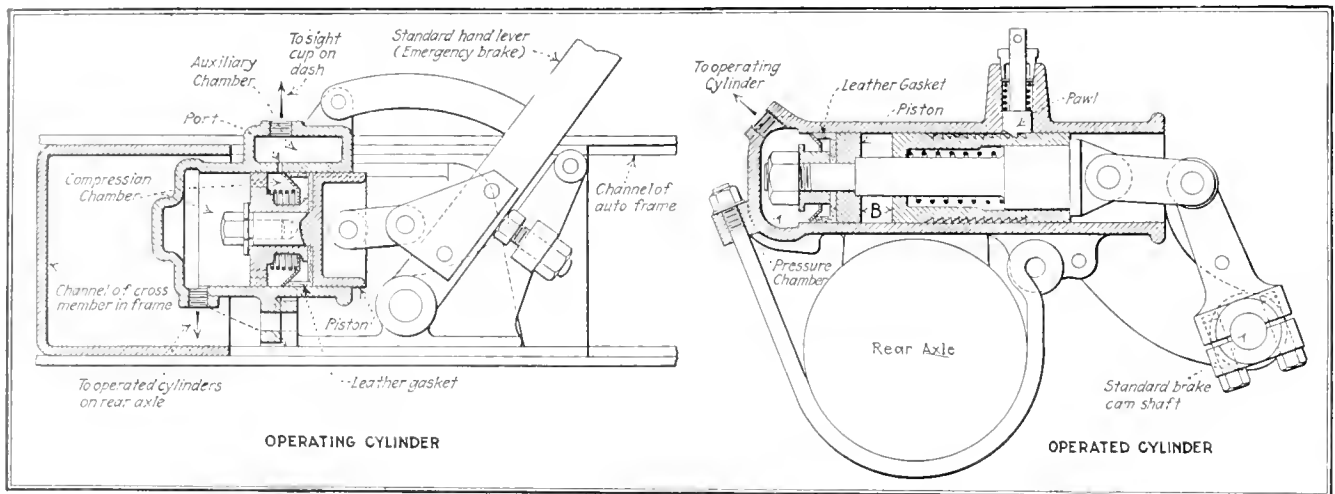
*Type of bus on which the hydraulic brakes are used*

new method should (1) eliminate brake rods, (2) give more powerful braking without being connected to the engine, (3) avoid danger of sudden action or "grabbing," and (4) be simple enough so a driver could use it without a period of training. Simplicity of installation without chassis changes and accessibility, of course, were prerequisites. The controlling features of the type selected, namely, the operating and the operated cylinders, are shown in the accompanying illustration.

The first car on the Peninsula Rapid Transit fleet to be equipped with these brakes, on March 1 had traveled 80,000 miles. In that time the brake linings had required renewal only once and with the re-

claim, will give the same braking independent of road and load conditions, and the leverage may be made two or three times that of brakes that transmit through rods. A self-adjusting feature, by keeping the brakes in correct adjustment, assures greater dependability and longer life to the linings and eliminates the need for frequent inspection. From the operating standpoint the claim is made that with less frequent brake-lining renewals, continuity of schedule can be maintained with a smaller number of reserve buses and a correspondingly smaller force in the repair department. Finally, unlike brakes applied by rods, hydraulic brakes cannot drag because tension cannot be trans-





mitted through liquid in a tube. On the other hand, spring deflections frequently cause tension in brake rods, which means heating and wear on brake linings.

As will be seen from the illustration, the brake operates on the principle that liquids are practically incompressible. The piston in the operating cylinder, which may be connected with either the brake pedal or the hand lever, forces the liquid through the pipe and through a short length of special rubber hose (to provide a flexible connection between frame and axle) into the two operated cylinders on the rear axle—one for each brakeshoe. The pistons in the operated cylinders are connected with the brake mechanism on the rear axle, as supplied with the vehicle.

The automatic adjustment consists of a ratchet sleeve concentric with the piston and a pawl. The piston has a collar on the outer end, and the distance between this collar and the piston body proper is greater than the length of the ratchet sleeve by the distance *B*. This distance *B* is the stroke normally necessary to operate the brake from the fully released to the fully applied position. As the brake wears, the piston travels further than the distance *B* and in so doing picks up the ratchet sleeve and carries it along. If this movement is greater than one tooth space the pawl drops into the next tooth. When the brake is released the piston can slide back through the ratchet sleeve only for the distance *B*. This is ample to fully release the brake, but the slack has been taken up by the ratchet sleeve.

In this way the stroke of the brake and consequently the stroke of the brake pedal or hand lever is kept within a predetermined limit. No

#### *Arrangement of hydraulic cylinders at operating and operated ends.*

The ordinary brake levers cause pressure in a cylinder whence a hydraulic medium transmits to another cylinder whose piston operates the brake shoe.

allowance need be made for the effect of spring deflection or torque reaction, because with hydraulic pressure instead of brake rods the brakes are applied independently of these effects.

The fluid pressures are transmitted through a  $\frac{1}{4}$ -in. pipe. In this the pressures are as high as 190 lb. per square inch, which is caused by a

100-lb. pull on the hand lever. Although water may be used, a special liquid is supplied which has a freezing point of 30 deg. below zero. A small reservoir containing about 6 oz. of this liquid is mounted on the dash; this automatically replaces any leakage and by means of a sight cup on the cowl makes known the condition of the hydraulic control system.

The brakes are made by the Horace Remote Control Company, 12 Steuart Street, San Francisco, which company also manufactures four wheel hydraulic brakes, torque amplifying and trailer control equipment.

## Financing the Union Stage Depot at Portland, Ore.

THE Union Stage Depot at Yamhill and Park Streets, Portland, Ore., is owned by the Oregon Auto Stage Terminal Company, a corporation whose stock is held by fourteen stage systems that use the depot. The structure was designed and built expressly for stage depot purposes on property which the corporation has under a five-year lease. A financial program for retiring the capital investment has been so arranged that at the expiration of the lease there will be a fund with which to start the financing of a larger terminal. A description of the depot and its method of operation appeared in BUS TRANSPORTATION for October, 1922, page 531.

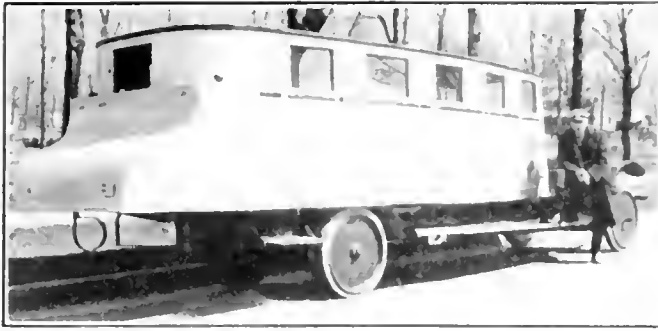
Rentals from concessions pay the rental on the property under the five-year lease, and a commission on tickets sold over the counter in the depot, plus a flat rate per scheduled stage departure, pay the operating expenses of the terminal, interest on the money invested and creates the fund

previously mentioned. The flat-rate charge to each stage system varies with the number of stage departures according to the following schedule:

Length of Route (Miles)	Fee per Departure if Gas and Oil Purchased at Terminal	Fee per Departure if Gas and Oil Not Purchased at Terminal
1-15	\$0.15	\$0.30
15-26	0.25	0.50
26-35	0.35	0.75
36-70	0.50	1.00
71-100	0.65	1.30
101-150	0.75	1.50
150-300	1.25	2.50
300 and over	2.50	5.00

Practically all of the stage systems buy gas and oil at the depot and get the benefit of the lower flat rate because it is decidedly to their advantage to do so, gasoline prices being 3 cents per gallon less than the current retail rate and oil prices being at prevailing wholesale prices. Where more than one car is required on each schedule—that is, where a scheduled departure is made in two or more "sections"—this is considered as only one departure, the terminal company expecting to realize increased revenue from ticket sales.





*Two views of the special Winton and of George Kronmeyer, designer and builder. Operated from Holland, Mich., on 34-mile route to Lake Michigan resort.*

## Bus Building by Bus Operators

**Different Methods Followed to Satisfy Transportation Requirements—Examples of New York and Michigan Workmanship—Sedan Type Developed from Passenger Car, and Street Car Bus from Light Truck**

**A**TENTION has frequently been called in BUS TRANSPORTATION to the more rapid development of the heavy-duty bus, as compared with the progress made by its smaller companions. For the last year or two, many makes of chassis and body, to provide seats for twenty-five to thirty passengers, have been brought out and have been successfully put into bus service.

But this is not the case with the bus having seats for sixteen or eighteen passengers, for which there is also a large and growing field. At present, the demand for such buses is being satisfied, to a considerable extent, by light trucks, or by heavy passenger cars which the operators themselves have remodelled or rebuilt, so as to meet their local requirements for transportation.

Lengthening of chassis frames to gain longer wheelbase and greater seating capacity; changes in rear ends, axles and wheels, to take care

of the increased load; improved lighting and seating accommodations—these are some of the changes being made by operators in many parts of the country.

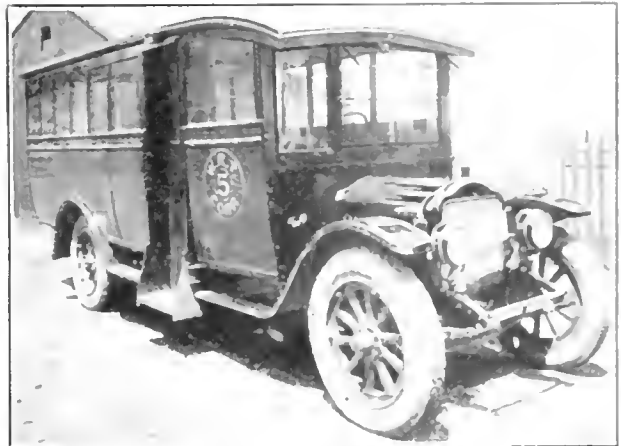
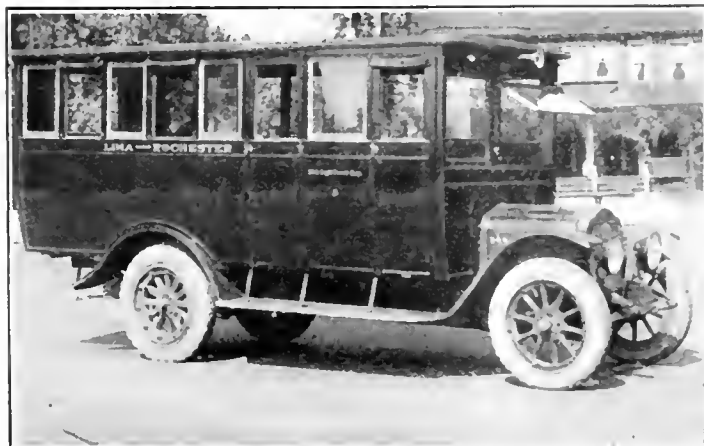
The two vehicles illustrated here are typical of this movement. Both are of eighteen-passenger capacity. The special Winton has five cross-seats, while the other job, which started in life as a Model 15 White truck, is fitted with a street car type of body. George Kronmeyer, manager of the Service Bus Line, who operates the Winton on a 34-mile route from Holland to South Haven, Mich., started from the beginning, really, and built up the complete bus

as shown here. On the other hand, Hyatt W. Norton, president of the White Rapid Transit Corporation, rebuilt a twelve-passenger street car type bus, of which "before and after" views are shown. This had been in service several years between Lima and Rochester, N. Y.

Mr. Kronmeyer worked for about six months in rebuilding a 1915 Winton touring car chassis. The work was all done by hand without blueprints or patterns at a cost for the entire job of about \$7,000. The rebuilt vehicle, which is 26 ft. long, will make about 40 m.p.h., carrying eighteen passengers in the five full cross-seats. The two in the rear are facing so as to give a smoking compartment, separated from the rest of the body by sliding glass partitions. In this compartment it is intended to provide a folding card table.

The work was started by cutting the frame just back of the cowl and placing there 2x6 channels long

*Before and after views of W.R.T. bus. At left, with twelve seats and double doors. At right, body and chassis rebuilt, with electric lights, door-opening device, roof ventilators, outside filler for gasoline tank, and other improvements*



enough to make the 188-in. wheelbase, which is an increase of 56 in. This elongated frame is braced by 1-in. round truss rods, with turn-buckles; these run the length of the chassis. Cross-members are placed 4 ft. apart to strengthen the frame. While the original rear end has been used, the wheels are cut down to carry Goodyear cushion tires, 32x5 single front and 32x4 dual rear. The wheels have been filled in with 18-gage metal, however, to give a disk appearance. It was necessary, of course, to lengthen the propeller shaft, and a center bearing was installed for support.

In the 20-ft. body, Mr. Kronmeyer has worked out a number of interesting details. The framework is oak, with Plymetl sides and Haskelite and duck roof; at the cowl the body is 44 in. wide, increasing to 74 in. at

through a Y-connection and two gate valves. These pipes have been turned down on a lathe to save weight and to give thinner walls, so as to transmit more heat. Elbows and unions have been used throughout the bus; these act as universals and prevent breaking at the manifold. It is said that with this arrangement, no gases can escape into the bus. So much for the work one operator has done in adapting a heavy passenger car chassis to his transportation work.

#### EIGHTEEN SEATS WHERE TWELVE WERE BEFORE

On the Rochester line, Mr. Norton decided to give his patrons up-to-date conveniences by remodelling a bus that had given good service. Note, first, the picture of the "Before Rebuilding" job. A White Model 15, standard chassis, body built several

the step and also the ground alongside—to speak of just a few of the special features. In rebuilding, a new windshield was put in, linoleum was placed on the floor, and new seats, ventilators and dome lights installed. One longitudinal seat was retained, while on the other side standard cross-seats were installed.

Mr. Norton made up his own drawings and in some cases the necessary patterns, then contracted with local machine shops, foundries, and a body maker for parts of the work. The cost for the changes was about \$450, this not including any allowance for time spent by himself and associates.

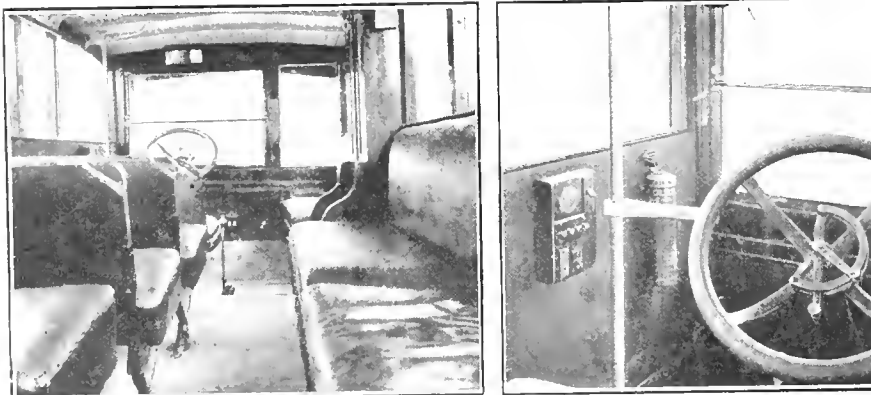
Two of the details worked out by the White Rapid Transit Corporation are here illustrated: The first is an arrangement to replace spindles on the White Model 15 chassis, and the second an opening device for service doors.

With the standard White construction it was found that when the spindle on the rear axle broke, considerable damage would be done to the brake system and bearings. Invariably the hub also was ruined, and after many accidents the cost of replacements often amounted to several times the cost of the spindle itself.

To overcome this, both the spindle and hub were increased in size. The hub was made heavier around the taper to prevent "stretching" so that it would loosen on the spindle and break at the end of the taper, where it is of square section. The new design, however, uses the same ball bearings, bearing retainer, hook bolts and brake drums.

At the same time a flange heavier and of larger diameter was installed. This has round instead of square holes, so that the hub bolts can be installed with the nuts on the outside of the wheel. On the standard type axle it is difficult to inspect or tighten the inside hub bolts. The change therefore, makes it a simple matter to keep the nuts tight in hot, dry weather and thus prevent wheel spokes from working in hubs or felloes. In addition a heavy lock washer and a U.S.S. nut can be used instead of a thin unfinished nut, which has to be riveted over.

The new construction, it is found, makes it much easier to replace broken bearings. For instance, if the ring is broken, the cone can be removed in a short time by inserting a punch in the grooves on the spindle bearing collar and applying force directly against the cone.



*Interior of White Rapid Transit Bus. Overhead, door-opening mechanism in closed position, and plunger in top of door jamb to hold door rigid. Close-up of control box for electrical equipment*

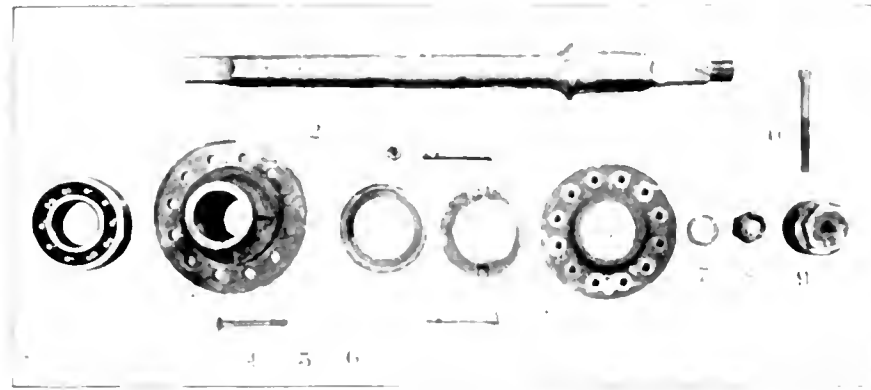
about three-fourths of the distance back, then narrowing down to 64 in. at the rear. Every joint and corner is braced with spring-iron fittings. At the rear a luggage carrier is built in.

A single door is provided for the pair of seats in the smoking compartment, but all the others have individual doors. Seats are spaced 38 in. apart. Rubber matting is used to cover the floor. Windows are all plate glass sliding in sash, and drop on rubber bumpers. The windshield, which was worked out by Mr. Kronmeyer himself, slides up and down in felt. Genuine brown leather is used for the 12-in. seat cushions, and artificial leather on the ceiling, which has two ventilators and two flush-type dome lights.

The heating system, which is another feature worked out by Mr. Kronmeyer, consists of 2-in. pipe inserted into the exhaust manifold

years ago, with separate door and a full-width seat for the driver, and a second door midway in the body, leading to longitudinal passenger seats; both doors of the limousine type, opening out. Then notice the rebuilt vehicle. Chassis frame lengthened to increase the wheelbase about 22 in.; heavier construction on the rear axle; a Ford generator was cradled on the left-hand side of the engine; electrical control concentrated in an instrument box where the driver can reach it conveniently.

In the body itself there were important changes. The rear end is just the same, but in order to give the larger seating capacity, the front end was entirely rebuilt. This has a curved roof, put in to make the body seem lower and thus attract passengers. A sliding joint at the dash, a green bulls-eye to signal the coming of the bus, a door light to illuminate



*Parts used to strengthen rear axle*

- |  |  |
|--|--|
| 1. Heavy spindle of new design.                              | 7. Axle washer.  |
| 2. Special type hub of larger diameter.                      | 8. Cast-iron axle nut, 1 1/2 in. diameter.   |
| 3. Extra heavy flange to secure better grip on wheel spokes. | 9. Special hub cap tapped for 1/2 in. puller thread, wheel hub cap which also fits disc cap. |
| 4. Bolt to be installed in hub.                              | 10. Screw for hub cap when used as puller.   |
| 5. Heavy lock washer.  |  |
| 6. Standard hexagonal nut.                                   |  |

With the new type the wheel can be removed, leaving the axle assembled and undisturbed. In fact, the wheel can be put on or taken off just as easily as the front wheel. This is a great advantage when it is necessary to repair any part of the brake system or to remove skid chains that have become loose and wound up in the brake rigging.

#### DOOR-OPERATING FIXTURE

The same company has developed a device for use in controlling the service door on its buses. As shown in the illustration, a bell crank locks the door closed. The crank is adjustable and can be used for right or left-hand operation, and for overhead or underneath connection to the door.

The rod used for operating the door is straight, and is connected to the rod carrying the driver's handle by a spring coupling. This is the most important part of the system perhaps, since it not only allows for chassis and body contortion, but also eliminates the strain and jerk usually experienced on the driver's handle. This coupling makes it possible, it is said, to move the handle through its entire stroke smoothly and quietly, either to close or open the door.

The apparatus includes a spring-actuated plunger inserted in the door casing. This is intended to eliminate door vibration by taking the weight off the hinges. When the driver's handle is released, the plunger forces the doors open, making them semi-automatic in action.

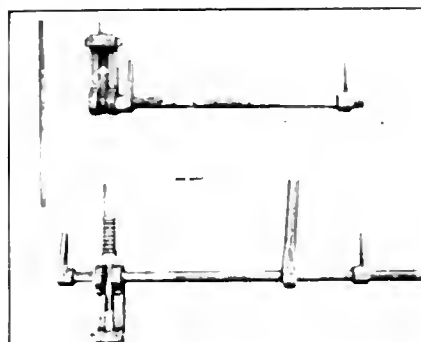
The control box which is shown in one of the views was designed by Mr. Norton; he also made the patterns and then had aluminum castings made to equip all the buses on his line. It houses the following

instruments, which were purchased directly from the manufacturers: An automatic circuit breaker, ammeter, four-gang pull switch, horn button, ignition switch, and bus bar for connecting wires without soldering. With this construction, the wires are completely removed from the dash and carried directly to the control box.

Another interesting feature of the electrical equipment is the door light, which takes the place of the ordinary step light used on many buses. This consists of an aluminum housing, semicircular in shape, mounted directly above the service door. Inside this housing is a 21-cp. bulb, the light from which is thrown directly down on the step, and also outward through two eyes cut in the housing. Passengers on the line are enthusiastic about this light, since it shines out 10 ft. or 15 ft. away from the bus and thus is a great convenience in approaching the step.

*Folding door operating fixture*

1. Operating bell crank, brass.
2. Rod 1-in. diameter for door and operating handle.
3. Bearings with brass bushings.
4. Spring coupling for operating connecting rod.
5. Operating rod end, brass.
6. Driver's handle.
7. Spring-actuated plunger for door casing.
8. Operating connecting rod.



In a profile of the grand old difference in the method of building the two buses mentioned here was mentioned. The Morgan operator started with a passenger car chassis and evolved a semi-truck. While the man from upstate New York increased the load capacity and at the same time made a number of important changes in order to have modern conveniences. There is one important likeness, however, in these two jobs, and that is, both are worked out to meet the transportation requirements that are actually found on the lines where they are used. Mr. Krommeyer, with his full cross-seats and rear luggage carrier, is equipped to serve passengers visiting the lake resorts at the South Haven end of his line, over a 34 mile trip. On the other hand, the Luma Rochester bus picks up passengers at various points along its route, and most of the business consists of people who come into Rochester for business or shopping, or who commute regularly to their work. This accounts, undoubtedly, for the street car type of body.

Both operators are alike again in finding that their passengers are enthusiastic about the new buses. In fact, passengers are more than outspoken in their approval; they are even suggesting that other buses be brought up to the same standard. This, of course, requires time. Mr. Norton regards his first job as on trial both as regards the design and its effect on the passengers. If the net result is satisfactory, then he can go ahead, of course, and rebuild his other buses. But certainly the first few months of operation have been satisfactory and give every promise for the future.

#### Printing Establishment Buys Bus

THE Von Hoffmann Press, St. Louis, Mo., one of the largest printing establishments in the West, has purchased a twenty-passenger bus to convey employees of the shop to the company's farm and summer resort near Bourbon, Mo. Albert Von Hoffmann, president of the company, said he was offering this means of pleasure to his employees on the theory that all work and no play makes all the Johns and Marys poor workers. The bus cost \$1300. It is especially designed for the use to which it will be put. The company has 300 employees.

# Science of Common Carrierism

The Experience of the Railroads Should Be Useful to Bus Operators—  
Similar Problems Affecting Rates, Service and Management  
Have Had to Be Met and Solved by Both

FOR years the automobile has been used, sold and made as an instrument of individual transportation. "Own your own car and forget time-tables" has been the slogan, and its power is shown by the 10,000,000 or so pleasure cars now in use. Consequently it is often difficult for operators and for the automotive industry to realize what it means now that this "individualized" vehicle is being subjected to many of the legal restrictions developed for steam railroads and electric railways.

The movement to class the bus with the older common carriers has gone so far that bus operators should know just how our present system of railroad regulation has been built up, and what are the important principles underlying control by the commissions and courts. To the seeker after such information, whether engaged in bus operation or manufacturing, the Vanderblue-Burgess book on railroads should have a strong appeal.\* The authors represent academic and legal viewpoints. Professor Vanderblue, now professor of business economics in Harvard University, has long been recognized as an authority on transportation. Mr. Burgess, as general attorney for the Chicago, Burlington & Quincy Railroad, has had extensive experience before courts and commissions in cases affecting railroads.

## ORIGIN OF TRANSPORTATION REGULATION

Bus operators should be particularly interested in the introductory chapters, which show how regulation developed as the result of the demand for cheaper transportation rates, mostly of farm products, that followed the business depression of the early seventies. Originally a creature of the state commissions, railroad regulation has steadily become a national function, vested in the Interstate Commerce Commission, and state regulation is confined to the routine details requiring knowledge of purely local conditions. A considerable part of the first section of the book is devoted, therefore,

to the work of the Interstate Commerce Commission, and to court activities determining the meaning of regulatory statutes.

Part II of the book starts with a historical discussion, showing how at first the railroads had the power in the first instance to establish rates, and as time went on the public took a hand to prevent rebates and unjust discriminations. Not until 1920 was the Interstate Commerce Commission given power to prescribe initial rates. Other chapters in this section analyze the general theory of rate making and the meaning of the "published rate." A chapter on the economics of rate making discusses constant costs and variable costs, as bearing upon the rates charged to attract business that would lead to the fullest utilization of the railroad plan.

The next section, on service, will undoubtedly be one of the most valuable to the bus operator to whom rate making is still a comparatively

simple matter. The authors start in by defining the fundamental principles of service; it must be adequate, it must be safe, and it must be continuous. They also call attention to the general tendency of the public to demand better and safer service, while at the same time legislation limits the rates charged. Other aspects are taken up in a chapter on "Regulations of Safety and Health," which are apart from the common carrier obligations of the railroad, but come from the fact that the public has a right to protect its citizens against anyone using his property so as to injure others.

This rise of the certificate of public convenience and necessity is traced under the chapter heading "New Construction and Abandonment." Such certificates came into being with the decline of real competitive building by the railroads. The various states then found it necessary to protect existing systems from the attacks of promoters.

## MANAGEMENT RESPONSIBILITIES

In the final section, which deals with management, the owner's side is presented, and also the fact that inasmuch as the railroads are privately owned, they have an obligation to the stockholders to earn profits. Here are included chapters on such subjects as railroad valuation, the rehabilitation of railroad credit, the protection of investors and the integrity of accounts. The last chapter especially should be of help to bus operators, since it traces the whole development of the elaborate system of accounting now practiced by steam and electric railroad companies. Just why maintenance and depreciation are singled out for special mention is explained.

One of the main purposes of the book is to give information concerning railroad regulation useful to men of affairs, and this certainly has been well fulfilled. Without being of undue length, it describes beginnings in such a way that the important facts are all at hand, and then it supplements this by copious references to commission findings and court decisions, and other authorities for the reader who wants more detailed information about any particular point. Yet it is up to date also, covering the working of the 1920 transportation act. Thus, "Railroads—Rates, Service, Management" can be recommended to any serious student of transportation.

## Moral: Inspect the Body Bolts Regularly

OTHERWISE the same thing may happen to your bus as did to the one in the photograph. Merrill Lauver, driver for the Kellogg-Hillside line, Wichita, Kan., with one passenger, was piloting his bus down



*The result of carelessness*

Green Street, when he suddenly felt the body of the bus lift out from under him. His bus had hit an overturned telegraph pole and the body, loosely fastened, swung clear of the chassis and overturned, as depicted in the illustration.

\*Railroads—Rates, Service, Management. By Prof. Homer B. Vanderblue and Kenneth E. Burgess. Published, 1923, by the Macmillan Company, New York. 188 pages, 6 x 9 in. Indexed.

# Electrical Equipment for Bus Service

*By T. L. Lee and G. R. Fessenden*

Chief Engineer                      Service Engineer  
North East Electric Company, Rochester, N. Y.

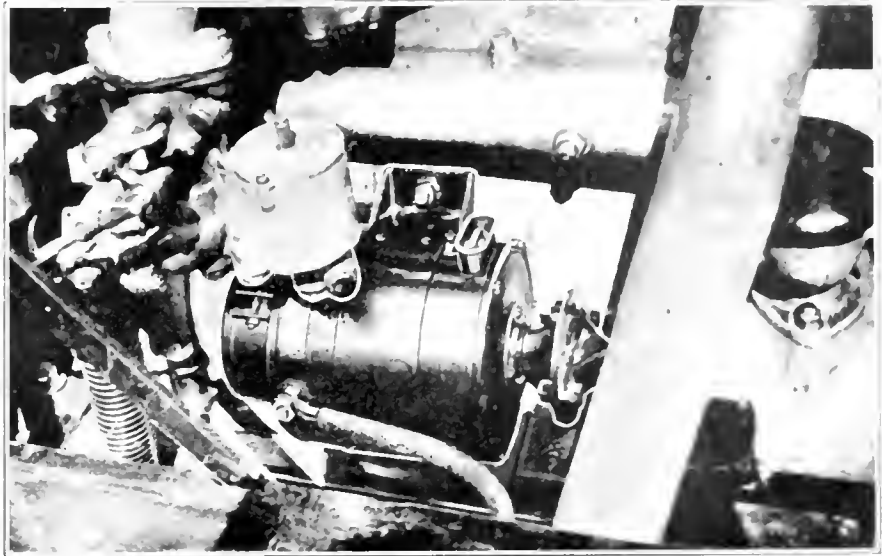
**The Three-Wire System Is Favored for Interior Lighting of Heavy-Duty Buses—The Authors Give Recent Examples of Generator and Voltage Regulator Construction**

THE success of the bus electrical system is dependent upon the battery, the body wiring, the lamps and switches, just as much as it is upon the generator. All these items should therefore come in for their full share of consideration. With the battery it is especially important to use sufficient capacity to accept the full charging current without undue rise in counter-voltage. The battery, also, should have capacity to take care of the lights properly during loading and unloading waits at terminals, when the generator is not running. To prevent undue vibration, the battery should be securely fastened down. It also should be covered as a protection from dirt, grease and moisture. It is essential, however, that the battery be located so as to be readily accessible for inspection, and particularly for refilling the cells with water.

The battery terminal connections should be of ample size to carry full load without appreciable voltage drop, and they should be securely fastened to prevent loosening up in service. Corrosion of these terminal connections should be guarded against by keeping them coated with vaseline or with some other protective agent.

## CAREFUL WIRING ESSENTIAL

Wiring, both of body and chassis, should be installed with the utmost care. Only the highest grade of wire, with first-class insulation, should be used, and each wire should be securely fastened in place at frequent points. The terminal connectors for these wires should be of the type that clasp the insulation as well as the wires themselves. Each splice and terminal connector should be well soldered and protected by tape. Ground connections should be made secure by lockwashers and dirt or



*Application of 300-watt generator on Fifth Avenue Coach Company engine*

paint carefully removed at points of connection, to insure good contact.

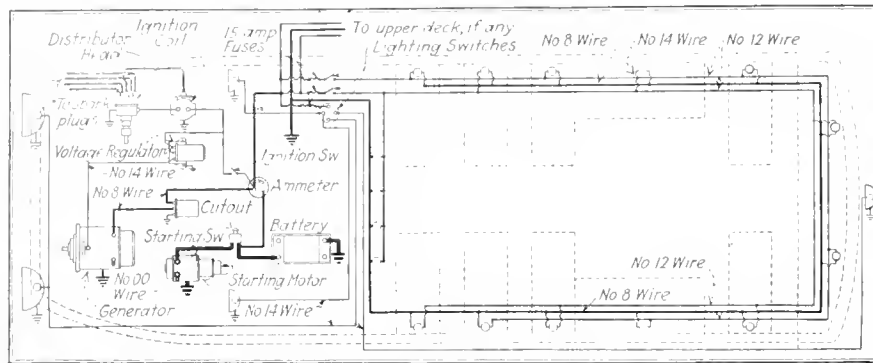
In its general layout, and especially in the sizes used for different circuits, the wiring is a matter of such importance that the North East Electric Company has prepared a standardized diagram representing what appears to be the best practice. (This diagram was worked out, originally, for the new buses now on order for the New York State Railways; these consist of Brockway chassis with Kuhlman bodies. The wire sizes recommended are: No. 8 for the charging circuit from generator through the ammeter and cut-out to the battery, and for principal lighting mains carrying full lamp current; No. 12 for the lighting circuits carrying only part of lamp load; No. 14 for individual lights and other circuits carrying less than 1-amp. load; No. 00 for the starting circuit. All these lighting circuits should be properly fused.

For the interior illumination, 21-cp. gas-filled bulbs should be used. The single-contact type is recom-

mended, because of its superiority over the double-contact type. In case of two-wire lighting circuits, the single-contact bulb can be used by connecting the common return wire to the socket of fixture, instead of to bulb.

The interior should be scientifically laid out to give the best possible distribution of light. Efficient reflectors or globes should be used, to give good diffusion and thus avoid glare. The lights should be sufficient in number to give an illumination of about 6 foot-candles at the reading level, for all passengers, this being the requisite illumination to read newspaper with ease.

As an example of equipment available for bus service, there are illustrated here a generator, cut-out and voltage regulator. The generator is the Model LG, recently brought out by the North East Electric Company for heavy-duty bus lighting service. The cut-out is the standard North East product; it is built as a separate unit and can be mounted on the dash or other convenient place.



*Wiring arrangement recommended for use with heavy-duty buses.  
Destination and step lights at right of battery*

The regulator is new and has been designed especially for the service encountered in the bus field.

As regards installation, the generator can be furnished either for cradle support, or with a No. 2 S.A.E. flange. It is designed to be driven at from one and one-half to twice engine speed, with a safe operating range up to 5,000 r.p.m. Coupling drive is furnished regularly, the double-disk type being recommended. Gear or chain drive can be used, however, although with the latter only an inclosed, thoroughly lubricated chain is advisable.

Mechanically, the Model LG is similar to the North East Model GA starter-generator, which is standard on the Dodge automobiles. Its diam-

eter is 6 $\frac{3}{4}$  in., and the over-all length is about 11 in.

Electrically, the unit is of the four-pole, shunt-wound type, with output controlled by third-brush regulation. It is a 12-volt machine, the rating being 300-watts on continuous operation, with a temperature rise not in excess of 175 deg. F. The maximum output is 20 amp., available at 1,450 r.p.m.; the cut-in point at which the generator begins to deliver current to the battery is at 850 r.p.m.

Generator output can be adjusted to any desired setting from full rating down to less than one-quarter maximum value. This is accomplished by a rack and pinion movement between the third-brush sup-

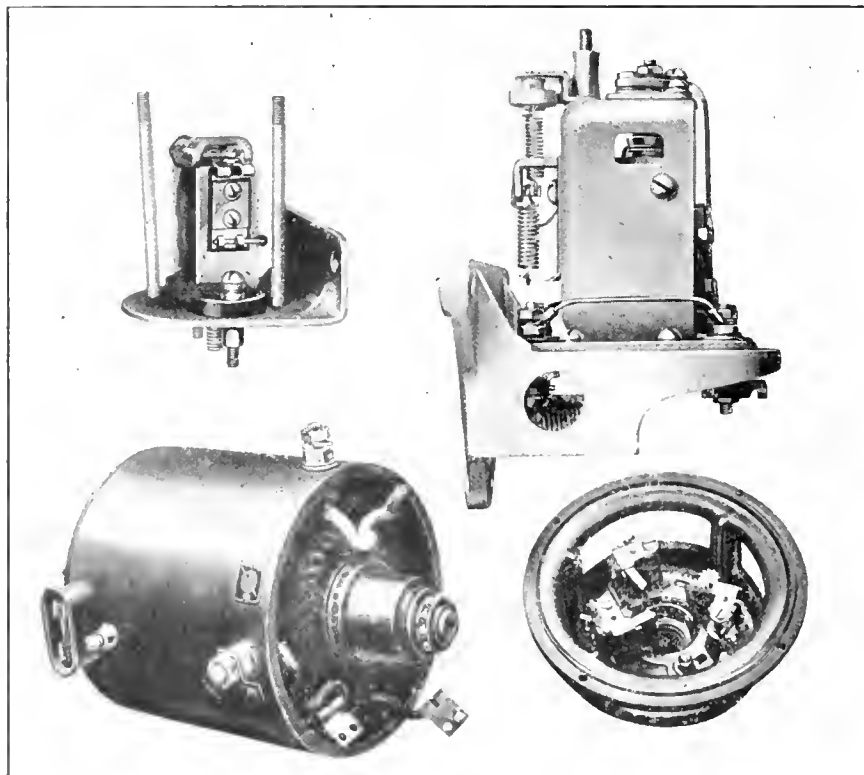
porting plate and the adjusting stud. The brush rigging uses the reaction type of brush-holder; this it has been found gives practically perfect commutation and minimizes wear, so that the brush life is more than doubled as compared with that obtained from ordinary forms of holders. To give protection in case of open circuits, loose connections, or grounds, the generator is provided with a field fuse, this being inclosed in a small housing on top of the field frame. When the generator is used with the ground-return system, one binding post can be grounded to the field frame, through an external ground strap provided for the purpose. This strap facilitates testing and also makes it possible to use the same machine either with two-wire, full-insulated circuits, or with ground-return circuits.

#### POSITIVE TERMINAL GROUNDED

The polarity of the generator is automatically reversible and will adjust itself to the polarity of the battery, regardless of which way connections are made. It is recommended, however, that the positive terminal always be grounded, to conform with the S.A.E. recommended standard.

The voltage regulator, which is also illustrated here, automatically cuts down the generator output as the battery counter-voltage rises during charge. In this way, the generator output is reduced to a negligible amount when the battery is fully charged, provided, of course, no lamps are burning. Whenever lamps are turned on, the regulator permits the output to increase sufficiently to pick up the additional load without affecting the condition of the battery. This regulator is of rugged construction, so designed that it is not affected by load changes, temperature or vibration. Its contacts are exceptionally durable, so that they will operate indefinitely without change of setting or possibility of sticking or burning.

In addition to the Model LG, 300-watt generator, a still larger machine, Model LF, of 600-watt capacity, is being brought out by the North East Electric Company. Except for the mechanical dimensions, the general characteristics of the larger machine are the same as those of the 300-watt unit. The diameter of the 600-watt generator is 7 $\frac{1}{2}$  in., and its over-all length is approximately 11 $\frac{1}{2}$  in.



*At top, North East cut-out and voltage regulator developed for bus equipment.  
At bottom, inside of commutator-end housing, showing brush  
rigging and output adjustment mechanism*



The necessity for city terminals with waiting rooms and other conveniences as a means of attracting traffic is outlined. Joint operation of these facilities allows for a more prominent location, a more economical operation and a more satisfied clientele. Plans are suggested for corner and center of the block locations with the most efficient utilization of space.

## Intercity Bus Lines Need Local Terminal Stations

By L. J. Carmalt

Consulting Engineer, New Haven, Conn.

**I**N MANY places the subject of bus terminal facilities is an important question confronting operators. This is especially true in places where rules and regulations governing curb loading are prescribed by the local authorities. In some quarters cities have indicated parking places where intercity buses can load and unload and lay over pending the next advertised departure. Often, however, there are several such places in a moderately sized city. It is suggested here how a terminal association or company can maintain a conveniently located station. This location must be near the business center and the steam railroad station, and if backed up by the bus operators can be operated with but little additional individual expense over and above the total amount actually paid by the individual operators.

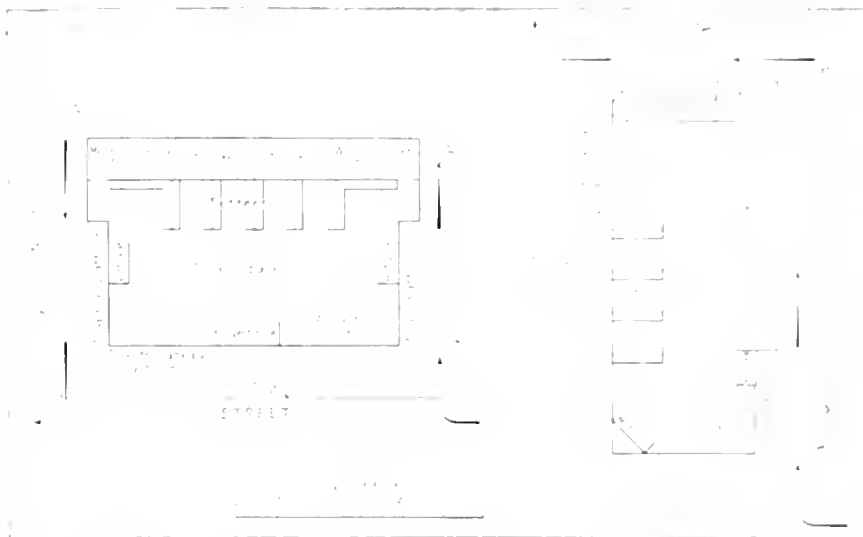
With the development of the motor bus from the initial stage of the "jitney" into its present form of a permanent agency for passenger traffic, full consideration should be given to those accessories of operation which are recognized as essential features of modern transportation. Among these features is the terminal waiting station.

Roughly speaking, motor bus lines (permanently established lines) are of three classes: First, the urban line, which sometimes competes directly with the street railway and caters to the same class of traffic; second, the feeder line, which is either operated by, or in close co-ordination with, the street railway and extends the service of the latter into districts where rail service is not justified in venturing; and third, the cross-country or intercity line which either opens up new territory or gives a service not attempted by steam or electric roads.

For the first two classes there is little need for waiting rooms. Passengers are picked up all along the route and discharged the same way. When acting as feeders there may be some reason for them, but there would be little justification for the expense as they affect only a very few passengers at a time and could

be grasped for advertising either a particular bus line or the transportation industry in general. These opportunities should not be ignored by those who wish to establish a permanent traffic clientele.

In many ways a bus terminal can only follow the pattern of waiting rooms for other forms of transport-



Layout for two typical bus terminals, with service area and entrance in the rear. On the left—for center of the block location. On the right—for a corner location.

not be more than shelters from the weather. With the third class, however, which handles very largely a through traffic from terminal to terminal, there is a definite call for a waiting room. The service—headway—is relatively so infrequent that passengers do not wish to take chances on missing a particular trip and are therefore on hand some time in advance of the scheduled leaving time and should be made comfortable while waiting.

In the present "state of the art" of motor bus transport, not only should this legitimate call be satisfied but also the opportunity

These will be mentioned in their proper place, but as there are other features, peculiar to motor transport, which should govern the arrangements they will be discussed first.

To begin with, the terminal should be jointly operated, partly because time has shown that this arrangement better suits the traveling public and partly because it is rarely that one bus line can support such a facility on a proper scale. At present, the terminals of many bus lines are either at the curb on some well-traveled street or they exist in the shape of a small, and generally dingy, combined office and waiting room

on a side street. This location is often outside the range of ordinary observation and difficult to find even with directions. Co-operation by several lines will permit the expense of a more prominent location as well as the establishment of other facilities that are more satisfactory to their clients and which tend to economy of operation.

On the assumption that, in general, these bus lines are complementary and not competitive to the steam and electric lines, a large proportion of their passengers use them as a part of a longer journey between points touched by the other lines. Therefore a terminal location that is easily accessible to the steam railroad station and on, or near, a street car line that gives frequent local service should be selected. The nearness to the railroad station restricts the field, while that to the street car line broadens it, but as there is always a street car line passing the railroad station the distance from the latter does not unfavorably affect the result. It is an advantage when it can be secured without undue expense.

To decide on a suitable location, particularly in a city whose congested traffic areas have to be crossed, is difficult. This is especially true when the bus routes radiate in opposite directions, but as the desirable features of a joint terminal are as obvious as in the case of steam roads, strong efforts should be made to reconcile conflicting interests and make the combination.

#### INSPECTION FACILITIES NEEDED

Due attention, therefore, having been given to the location from the traffic viewpoint, its location with relation to the service station, which should also be the garage, must be considered. It is well recognized that frequent inspection and constant maintenance are necessary to obtain the most steady and economical service out of such a machine as a motor bus. Inspections are desirable, if possible, after every trip, and if there is opportunity for skilled mechanics to make quick, light repairs during the layover between trips, it is an advantage that should be seized. This can only be done by having the service station close by, if not part of, the terminal. Dead mileage and lost time is also thereby reduced to a minimum. Land in the interior of a city block adjacent to

that used for the waiting room is most desirable for such a service station. No other access to the street, then, is needed except through the terminal if the service station is under the same management as the terminal. Such an arrangement is shown in the accompanying diagram. It often develops, too, that such a combination of facilities can be obtained at a lower price than for two separate buildings and sites.

The approaches to a bus terminal station offer opportunities for deviation from what is possible with other means of transport. Not being limited by the rigidity of track location, as in the case of steam or electric roads, or of a pier head line in the case of water traffic, the arrival and departure stands for buses can be fitted to great variations in the lay of the ground and the shape of the property. Moreover, with the constantly increasing congestion of traffic, the bus will gain public favor by keeping off the streets whenever possible. In other words, buses should make terminal stops and do their parking on their own property. This plan leaves the curb space available for other terminal uses.

A most convenient arrangement for the approaches is to have separate incoming and outgoing driveways, placed at the extreme edges of the property with the waiting room between. This separation works in harmony with the program, already mentioned, of running the cars to the service station in the interior of the block for gasoline and for inspection during the layover period. To illustrate this, sketches are given showing arrangements for the corner and middle-of-the-block locations. The separate arrival and departure platforms, which of course should be sheltered, are of sufficient length to allow two buses to stand at each at one time. Their actual length will, of course, be based on the frequency of the bus schedules and the size cars requiring space at any one time. This arrangement provides for considerable space between the two platforms, anywhere within which the entrance and exit to the service station can be placed. This plan also permits of a considerable choice and flexibility in arranging the relative positions of the waiting room and the service station.

As for the interior arrangement of the waiting room, there is no reason for any material differences

from practices in waiting rooms belonging to other transportation agencies. Comfortable space for seats and standing room, conveniently placed ticket offices, package room, sanitary toilets, the usual concessions for newspapers, cigars, soda and candy, and possibly light lunches, are the same as in any terminal station.

It must be borne in mind, however, that the bus station is a new thing; that it has a reputation to establish; therefore it must make special effort to prove itself a real convenience—and ultimately a necessity—not a mere makeshift, and it must act also as an advertisement to attract new and permanent patronage. This does not mean that extravagance must be shown in appointments, but true service, represented by convenience, cleanliness and order, must be given within the financial limits of the operators.

#### PASSENGER CONVENIENCE THE FIRST REQUISITE

Take these points in order, and consider first the convenience of passengers. The accompanying sketches indicate in general the difference in arrangements necessary for corner and middle-of-the-block locations. Various modifications will always have to be made to fit any particular property available, but the diagrams indicate the relative spaces and locations to be used for the different purposes of the terminal. Ticket offices, although not needed much now, will become necessary with increasing travel. Let it be noted that for economy of service the package room is placed next to the ticket office so that one attendant can look after both, as this service rightfully belongs to the transportation company and not to a concessionaire. The concessions are also placed together so as to be served as far as possible by one attendant. A free, open space should be left between the doors leading up to the ticket offices and the stands. The settees should also be placed by themselves, somewhat out of the general line of movement, so that those seated will not be disturbed unnecessarily, but should be placed where the doors can be watched and announcements of departures heard.

The matter of cleanliness cannot be too strongly emphasized if bus travel is to be made attractive. The neatness of a clean stage, in charge of a neatly uniformed driver, must

be carried into the terminal. In this the bus terminal corporation can learn much from the experience of the other transportation companies. The present stage of the building art offers a chance to use excellent material for securing this result at a moderate expense. A dingy, dark, dirty or ill-smelling station can do nothing but deter travel, while the contrary attracts. Non-absorbent materials must of necessity be used for floors, walls and fittings, well-recognized ventilation and heating systems installed and plenty of light furnished.

To maintain cleanliness an attendant should always be on hand to remove the rubbish as it accumulates; he can also serve as a porter to assist women or infirm passengers with their hand baggage; and, like all other employees, he

should be clothed in a neat uniform. Good order must likewise be observed. The waiting room and platforms must not be allowed to become the resort of idlers. Even employees off duty, the bus drivers when waiting between trips, should not use the waiting room as a gathering place; but separate, comfortable quarters should be provided for them. There is always danger that the concessions will tend to attract those who may become undesirable and therefore their holders must be held to strict account for neatness and order around their stands.

In short, the station should be so arranged and managed that it will give a noticeable impression of good order; then its popularity, which will mean the popularity of the bus lines which it serves, will grow by leaps and bounds.

## Street Occupancy by Buses and Trolley Cars Compared\*

IN ENGLAND and Scotland the city transit companies are not as wasteful of the public roadway space as in New York. The general dimensions of the several types of vehicles, both buses and street cars, used in New York, Liverpool, Glasgow, Edinburgh and London are shown in the accompanying table.

An analysis of this table indicates that on the average, the English and Scotch types of street cars, when compared on the basis of street-space occupied per passenger seat or per linear foot in the traffic stream, occupy only about half of that required on the average for the New York City types of cars.

A comparison of the double-deck types indicates that the New York car takes up 48 per cent more roadway space than the type generally used in London, whereas the new single-deck Peter Witt type car for operation in Brooklyn uses up 2.43 times more roadway space and 2.19 times more stream-line space per passenger seat than the London double-deck car.

These figures would indicate that

Buses and street cars of the double-deck type are held to be the most economical users of street surface space when compared on a passenger seat basis. With a reduction in the number of wasteful users of street space, such as taxicabs and touring cars on the streets, double-deck buses could be substituted on a more completely articulated service, thereby affording relief from traffic congestion. This plan would also allow service in the surface car lines to be materially improved.

New York is not giving consideration to economy of street space used by its street cars, although there is much talk about the necessity of having to provide additional thoroughfares for the increasing highway traffic.

### BUSES UTILIZE STREET SPACE MORE ECONOMICALLY

Now consider the buses. Eight buses are shown in the table, two of which are used in London, and the others in New York City. The latest

type London bus seats fifty-four passengers and requires 3.24 sq.ft. of roadway area per passenger seat, and 0.46 lin.ft. of stream-line space for each individual seat. The single-deck London bus, which is not yet in general use, has seats for forty passengers and occupies 3.91 sq.ft. of roadway area and 0.56 ft. of linear space per passenger seat.

Several types of buses in use in New York City do not compare unfavorably with these English buses. The most efficient利用者 of street space is the Leindorf bus, which occupies but 3.28 sq.ft. of roadway area and 0.41 lin.ft. of space per passenger seat. The Leindorf Corporation, it is said, is developing a seventy-passenger bus, but its dimensions are not now available. The fifty-one-seat bus of the Fifth Avenue Coach Company also compares favorably with the English types.

Among the more extravagant users of street space are the miscellaneous buses used on the city's bus lines. The Mack single-deck bus for instance takes as much as 7.1 sq.ft. of road surface and 0.99 feet of linear street space per passenger seat. Such a bus uses 2.38 times as much roadway space and 2.3 times as much stream-line space as the London seventy-eight-seat double-deck street car. If compared with the best type of bus, the London double-decker, the corresponding figures are 2.28 and 2.15 times greater respectively.

### AMERICAN DESIGNS PERMIT STANDEES

The above comparisons are on a seat basis, because abroad regulations require that only a relatively small number of passengers are permitted to stand, even during rush hours, whereas in New York City cars are designed to carry a considerable number of standees. If 100 per cent standees are considered a maximum on the street cars and 50 per cent on the buses, the comparable figures would be somewhat different. For instance, the Brooklyn Peter Witt car would occupy 3.79 sq.ft. of roadway area and 0.47 lin.ft. of stream-line space per passenger as against 3.11 sq.ft. and 0.43 ft. of linear space for the English double-deck type of street car.

In the case of the buses, the corresponding figures, 3.21 and 0.46 for the London double-decker, would compare with 2.19 and 0.27 respectively for the Leindorf bus. No change would occur in the Fifth Avenue type

\*Abstracted from the second part of a report on transit conditions in Europe. The first portion of the report, comparing bus transportation in New York with those of London, Paris and Berlin, appeared on page 23 of the January, 1923, issue of BUS TRANSPORTATION.

Comparative Use of Street Space by Various Types of Buses and Surface Cars

No.	Type	Length Ft. In.		Width Ft. In.		Height		Seats*	Area Sq. Ft.	Sq. Ft. per Seat	Sq. Ft. per Pass. 100 Per Cent Overload	Lin. Ft. per Seat	Lin. Ft. per Pass. 100 Per Cent Overload
						Above Top of Rail	Top of Rail						
1	Liverpool double-deck	30	2	7	4	.	.	64 42 up C 22 low L	221 18	3.46		0 47	
2	Glasgow double-deck	30	0	7	2	16	1	62 38 up C 24 low L	215 10	3.47		0 48	
3	London County Council double-deck	33	10	7	2	16	0	78 44 up C 34 low L	242 50	3.11		0 43	
4	Third Ave. cross-seat	43	0	8	3½			48	356 47	7.43	3.72	0 90	0 45
5	One-man	22	4	7	8			30	171 27	5.71	2.86	0 74	0 37
6	Brooklyn center-entrance	45	8	8	5½	11	0½	59	384 48	6.63	3.32	0 79	0 39
7	Brooklyn new Peter Witt	44	6	8	0	10	6	47	356 00	7.57	3.79	0 94	0 47
8	New York Bys. double-deck	44	0	8	3	12	11½	79 38 up L 41 low C	363 00	4.60	2.30	0 56	0 28
BUSES													
9	London General Omnibus Co. double-deck bus	24	8½	7	1	12	3½	54 28 up C 26 low C	174 95	3.24		0 46	
10	London Special single-deck bus (Thickman Body Co.)	33	6	7	0			60	234 50	3.91		0 56	
11	Municipal (N. Y. C.)	26	0	7	4			30	190 58	6.35	4.14	0 87	0 44
12	White bus	23	4	7	3			30	169 10	5.70	3.80	0 78	0 32
13	Black bus	19	10	7	5			20	147 10	7.40	5.00	0 99	0 66
14	Stewart bus	15	4	6	7			17	101 00	6.00	4.00	0 90	0 60
15	Fifth Avenue double-deck bus	24	4½	7	4	13	6	51	178 78	3.50		0 48	
16	Leerdorf double-deck bus	25	0	8	0			61	200 00	3.28	2.19	0 41	0 27
MISCELLANEOUS													
No.	Type	Length		Width		Height		Seats	Area Sq. Ft.	Sq. Ft. per Seat	Sq. Ft. per Pass. with Two Pass.	Lin. Ft. per Seat	Lin. Ft. per Pass. with Two Pass.
17	Packard touring	16	8	5	6			7	90 3	12.9	45.1	2 38	8 33
18	Cadillac touring	16	0	5	7			7	89 3	12.8	44.7	2 27	8 00
19	Ford touring	11	8	5	8			5	66 1	13.2	33.0	2 33	5 83
								Averages		12.97	40.9	2.49	7.36
20	Yellow taxi	14	6	5	6			5	79.8	15.9	39.9	2.90	7.25

Note: 1 58 sq.ft. per standing person—crowded, but one can move through crowd.  
1 96 sq.ft. per standing person—crowding no greater than on a sidewalk of a busy street.

\*C, cross seats; L, longitudinal seats.

of bus, as no standees are permitted. The policy of carrying standees to the limit in New York has resulted in the design of a type of vehicle that is most extravagant in the use of street space. This policy ought to be changed and the production of a type of car along the lines of the New York Railway double decker, that will utilize the roadway space more economically, should be compelled.

The best types of double-deck buses should be adhered to and developed for use in congested travel lanes, while the single-deck types of buses should not be used under such conditions.

#### USE OF STREET BY TOURING CARS AND TAXICABS

On the average the touring cars occupy about 13 sq.ft. of roadway surface and approximately 2.5 lin.ft. of space per passenger seat. These figures are on the basis of all seats full, which is rarely the case. On a two-passenger basis, which is considered the average, these touring cars would occupy 4½ sq.ft. of roadway area per passenger and on the basis of three passengers 27 sq.ft. or from nine to ten times as much area as is required by the most economically designed street car. It is this

extravagant use of street surface space that is causing the difficult traffic conditions.

The taxicab is a still less efficient unit. It occupies approximately 16 sq.ft. of roadway area, on the basis of five passengers per cab, and nearly 3 lin.ft. per passenger. With an average load of two passengers each one requires 40 sq.ft. of area or thirteen times as much space as is necessary by the most economically designed passenger carrying vehicle. The answer seems to be that one of the cures for street traffic ills is a reduction in the number of taxicabs and touring cars allowed on the streets and in their place provide the most economical space-using type of passenger vehicle, namely double-deck buses and street cars.

This study means that the two passengers in a touring car or taxicab are occupying sufficient roadway space to transport twenty-six passengers. If the street traffic were not so dense and all vehicles—buses, automobiles and cars—were able to run free, the conditions would be very different. The importance of the street space occupied by a passenger vehicle would be minimized and the comparisons made would not hold. These are not the conditions, however, under consideration. When

traffic jams, and when street traffic is so dense that vehicles are crowded together practically into solid masses, then it is the comparisons which have been made here emphasize the wastefulness with which street space is now being used.

#### EXTENSIONS OF 10-CENT BUS SERVICE DESIRABLE

The extension of the so-called luxury bus service would be a great benefit to the public. A completely articulated system of uptown, downtown and crosstown 10-cent fare, seat service buses would be welcomed by a large number of people who now use touring cars, taxicabs, trolleys, and rapid transit lines from necessity rather than from choice. The result would be to eliminate many extravagant space-using vehicles from the streets. In turn, by reducing interference to surface cars the latter would be able to provide a greatly improved 5-cent fare service in the interests of those who desire to use this means of travel or who could not afford to use the 10-cent fare bus service. By these means, both a more extensive luxury bus service and a greatly improved surface car service would result and everybody would be happier with their transit facilities.

## Municipal Bus Line Montebello's Sole Means of Transportation

IN SPITE of its proximity to Los Angeles, Montebello, Calif., a town of 3,000 population in the adjacent oil fields, is without any direct street railway communication with the California metropolis. When the question of a municipal system of motor transportation recently arose, the Mayor of Montebello appointed a committee of engineers to study the types of bus fitted to the municipality's needs. As a result, the city had designed and constructed by the Moreland Motor Truck Company of Los Angeles two sixteen-twenty-passenger street car models with underslung coach chassis. These motor coaches form the first unit of Montebello's municipal transportation system operating between that city and the terminus of the Stephenson Avenue line of the Los Angeles Railway. In deciding upon the type of body and chassis most suitable for the conditions under which this transportation line was to operate, the matter of safety was the paramount issue in the minds of the city's committee. The CR type of chassis adopted for this bus line has many safety features not found in conventional truck chassis.

The designers realized that the



The CR type chassis is the most rugged and safe.



The CR type chassis is the most rugged and safe.



The complete bus has accommodations for eighteen passengers. The side door is open.

only way of lessening the danger of overturning was to lower the center of gravity; therefore, the low drop frame was adopted after considerable research. This construction, together with the use of the latest type of coach wheels, and 32x6 heavy-duty cord tires, gives a maximum floor height of 22 in. above the ground. The lowness of this chassis and possibilities of easy entrance and exit were outlined in the city's plans. In the construction of the body the furtherance of the principle of safety was specified by the city; therefore, the entrance was provided with a single step, and the folding type of door set flush with the body and operated by the driver was adopted.

In addition to these features the coach was provided with a safety door in the rear, also controlled by the driver and providing an emergency exit in case of accident. "Pyraline" was used in the windows to overcome the danger of glass breakage, which occurs frequently in the conventional type of window. Patrons of the new municipal bus line are unanimous in declaring these specially-designed coaches the acme of speed and comfort.

#### SPECIFICATIONS OF MONTEBELLO BUSES

The Montebello body is built to carry twenty passengers seated. The body is 17 ft. long inside, 84 in. wide inside at the belt line, and has a 6-ft. 4-in. headroom.

The seats are of the street car type, having pressed steel bases, covered with leather. They are 32 in. wide, spaced 32 in. back to back, the aisle being 18 in. wide. One longitudinal seat is placed on the left at the entrance, two more over the rear wheels, and the others are cross-seats.

The ceiling is finished natural wood, the top slats being butted together, giving a solid wood panel. Below the windows is wood veneer, finished in natural wood. The aisle is covered with brown linoleum, the edges being bound with aluminum strips. The interior is lighted by four dome lights arranged over the passengers, instead of the aisle.

The top is light spruce slats glued and screwed to crossbows, padded with soft felt and covered with black top material. Three ventilators are provided in the top.

The chassis is of the drop-frame type, 180-in. wheelbase, having a "kick up" in the frame side members

over the rear axle, and a drop behind the engine.

The Hercules engine is four-cylinder, water-cooled "L" head type, 4-in. bore and 5-in. stroke, inclosed valve mechanism, maximum horsepower of 43, full force feed lubrication. The transmission is Brown-Lipe, unit-

power-plant type, three speeds forward and one reverse. The rear axle is a Timken, with bevel gear, and a 5 to 1 gear reduction. External contracting and internal expanding brakes operate on rear-wheel drums, 16 in. diameter and 2½ in. wide. Front axle is Timken I-beam section.

## Rebuilt Reo for Portland Suburb



*Rebuilt thirteen-passenger bus, used in suburbs of Portland, Ore.*

**A** MOST complete stage of the rebuilt type was recently finished for service from the Union Stage Depot in Portland, Ore., to Dunthorpe-Rivera, 7 miles out on the west side of the Willamette River. This is a high-grade residential district consisting mostly of millionaires' homes, and the residents have guaranteed a stated monthly income to the bus operator. Hourly service will be supplied until 8 o'clock in the evening, and after that hour special trips will be made for theatergoers.

Starting with the Reo Speed Wagon chassis, the builder, Hal De Waide, has changed both structure and appearance so that an entirely different vehicle has emerged. This is guaranteed to do 55 miles an hour or better, and to have ample power.

The most important change in the chassis is the lengthening of the wheelbase. This has been increased 5 ft. 10 in., so that, as shown in the photograph, it is 198 in. Truss rods are carried underneath on each side to brace the lengthened frame. The rear springs were lengthened 12 in. to provide easy riding. The tires on the rebuilt design are 35 x 5, and the propeller shaft is supported by a double row of self-aligning ball bearings. The dashing appearance of the bus is due mainly to a false radiator shell and hood, which were worked out and applied by the body builder.

The body has accommodations for thirteen passengers, on seats spaced 36 in. apart, and arranged in compartments. At the front the driver's

and smokers' compartments are upholstered in black leather, and the women's section in taupe velour to match the trim. The ventilating system includes vents in the two doors to the rear compartments, two roof ventilators, and plate glass windows, which can be dropped into the doors. The interior has floor heaters, and is lighted by a system which gives the effect of cosy luxuriousness. Lights are controlled from a switchboard in the driver's compartment.

Exposed hardware, radiators, shell and lamps are heavily nickel plated. The inside finish is mahogany. Wheels are in natural finish, and the body in three colors, Arizona brown for the lower part, ivory cream for the band, and Zuni brown for the upper panel. The removable top is finished in enameled duck resembling patent leather. Black enamel is used on the fenders and side pans. Running boards are covered with linoleum, with aluminum binding.

The luggage carrier at the rear, which is said to be air and water tight, is built of Vehisote. Spare tires can be carried in sedan style between the rear of the bus and the carrier.

A representative of the Inter-State Motor Transit Company has made arrangements to start a bus line between Butler and Harrisonville, Mo. This company now operates from Nevada, Mo., to El Dorado Springs and Fort Scott, Kan. The round-trip fare will be \$3; one-way fare, \$1.50.



# Bus Operation in the Hoosier State

High-Class Equipment, Coupled with Good Roads, Makes Bus Riding  
Inviting—Legislation and Road Program Favorable to Buses in  
Indiana—Local Organizations Have Proved Beneficial  
in Supplying Terminal Facilities

**M**OTOR bus operation of the proper kind is developing rapidly in the state of Indiana, due, no doubt, to the freedom from restrictive legislation which the operators enjoy. A survey of the territory served by buses discloses the fact that within the past year strides have been made toward bringing the motor transportation business out of the jitney period of its life into the more substantial form of existence which it now enjoys. Bus lines have sprung up all over the state with the result that there are now about 75 companies making regular schedules over a distance of about 3,000 miles of country roads, or, as is estimated in the report of the State Highway Commission, a total of 16,000 vehicle-miles operated per day. Of the total route distance 2,600 miles or 87 per cent is over the state highway system.

In the northern part of the state there is almost a continuous line of connected bus routes extending from the Illinois border to the Ohio border, broken only for a short distance of about 20 miles between Laporte and South Bend, due to a road condition which makes it undesirable for bus operation. The busy, prosperous towns that are located in the northern section of Indiana offer an inducement for intercity bus transportation from one to the other, and for interstate operation between them and the many towns located in Michigan. Connections may be made at any of these northern towns with lines which lead into the central part of the state. However, no connection has as yet been made between these routes and the bus routes which so thickly crowd the territory surrounding the state capital.

## INDIANAPOLIS A BUS CENTER

Although Indianapolis is the largest electric interurban center in the United States, the bus operators have found and developed a business of their own with the type of transportation which the public desires.



*The Indianapolis Terminal is only a block from the hotel district.  
Buses load from the curb*

On March 1, 1922, the first inter-urban "jitney" arrived and departed from the curb in front of an old laundry located near the heart of the capital. Prospective passengers, at first waiting on the curb for the lone pioneer, were later made as comfortable as possible on improvised seats in the laundry.

Such was the start. Today, a fine depot with adequate waiting room and concessions is open to the prospective patrons. Known as the Union Bus Depot, it is maintained by the various bus lines which reach out from it in all directions like a huge spider-web. The owners of these lines are also members of an association which has for its purpose the betterment of motor transportation in the state. The bus operators confine their activity to the country highway and, due to the short distance between the various towns and cities in that vicinity, a profitable business has been established by this mode of transportation.

At the depot on Kentucky Avenue some 200 buses arrive and depart daily. The combined mileage of these lines is 267, the longest being to Rockville, 60 miles, and the shortest to Fort Harrison, about 10 miles. About half the total mileage is paved. The depot itself is on the ground

floor in what was formerly a store, with a space of 50 ft. x 75 ft. The terminal company, which leases this space, is incorporated for \$5,000, and all bus owners participating in the use of the terminal hold equal shares of stock of no par value. The street in front is very wide so that there is space in the center in which the buses are parked while waiting for passengers. Inside the store are concessions such as soda fountain, cigar-candy stands and boothblack stand. On one side is a blackboard where the schedule information for each line using the terminal is printed in chalk or white paint. In addition, as each bus is ready to leave the driver calls out the route, the terminal and the intermediate points reached. The depot is open from 6 a.m. to midnight each day. Each bus owner pays as rent \$5 per bus per month, and this plus the rent from concessions leaves a little reserve for unusual expenses. The officers of the terminal company are O. P. Lloyd, president; J. A. Fendley, vice-president; and Stanley Pitchford, secretary-treasurer.

The grouping of all these buses at one terminal has also led to an interesting development in maintenance methods. A considerable number of the vehicles leaving the Union Depot

use the facilities of an independent garage near by. This garage makes a specialty of bus maintenance and, at a flat cost of \$2.50 a week, thoroughly greases each bus. In addition it changes the oil in the crankcase, washes the vehicle once or twice a week and handles other minor repair jobs at a reasonable rate.

The original equipment of touring cars or made-over vehicles, seating four to ten in a more or less uncomfortable fashion, has been replaced by new equipment of the

finest quality. Plans for future development of these lines indicate that the latest design and construction embodied in highway transportation vehicles will be practiced. Body builders of the state have furnished the operators with a good body design with cross seats and center aisle. This street car type of vehicle is used extensively, if not entirely, by all the legitimate operators in the state. The condition of the roads, which is fair, has been taken into consideration by the oper-

ator or owner in the selection of the proper type of chassis and body.

#### FARES ARE COMPETITIVE

Fare collection and auditing of accounts, with substantial records to show the actual cost of operation, have not as yet received study from the bus operators. One owner whose buses are driven by paid operators has found the locked type of fare box highly satisfactory on all of his lines. The bus driver is supplied by the owner with sufficient change for

### Statistical Information Regarding Motor Bus Routes in Indiana as of May 15, 1923

Map Key No.	Route	One-Way Distance (Miles)	No. of Vehicles	Unit Seating Capacity		One-Way Fare	Minimum Fare	Fare Basis	Rate per Mile (Cents)	Average No. Round Trips per Day			Normal Outside Time		Running Time (Min.)	Headway (Min.)
				Buses	Touring Cars					M-F	S	S	A.M.	P.M.		
1	Clinton to Dana	19 0	3	18		\$0.75	\$0.05	D	3.90	3	4	4	7:00	10:00	60	120
2	Clinton to Libertyville	11 0	4	18		.50	.05	D	4.54	3	4	4	7:00	6:30	30	*
3	Clinton to Universal & Blanford	5 0	4	18		.30	.05	D	6.00	8	10	10	6:00	11:00	35	60
4	Cayuga to Danville, Ill.	25 0	2	18		.70	.10	D	2.80	2	2	2	7:00	5:30	90	(a)
5	Elkhart to Bristol	9 0	2	14 20		.25	*	D	2.77	6	6	3	6:00	6:20	30	120
6	Elkhart to Goshen	11 0	2	*	*	.25	.10	D	2.27	18	19	18	5:30	12:00	45	60
7	Elkhart to Wakarusa	13 0	2	16		.65	.25	D	5.00	3	3	3	7:00	9:00	45	*
8	Ft. Wayne to Angola	65 0	3	20		1.50	.25	D	2.30	2	2	2	7:00	6:45	165	(a)
9	Gary to Miller Beach	5 0	5	20		.25	.05	F	5.00	32	36	24	5:00	1:50	30	20
10	Goshen to Ligonier	18 0	2	18		.40	.10	D	2.22	4	4	4	6:00	7:00	50	180
11	Goshen to Middlebury	12 0	1	6		.50	.25	D	4.16	2	2	2	7:00	6:30	45	(a)
12	Bremen-Goshen via Nappanee	28 0	2	10		1.00	.10	D	3.50	2	2	1	8:00	5:15	90	(a)
13	Hammond to 63rd & So. Park, Chicago	5 0	4	18		.25	.25	F	5.00	*	*	*	*	*	*	*
14	Huntington to Columbia City via So. Whately	23 0	1	10		.65	.10	D	2.82	2	2	2	7:00	6:40	100	(a)
15	Huntington-North Manchester	16 0	1	8		.50	.10	D	3.12	2	2	2	9:10	7:15	75	(a)
16	Huntington-Warren	14 0	1	12		.50	.10	D	3.57	2	3	3	7:00	4:30	55	(a)
17	Huntington to Marion	25 0	2	16		1.00	.10	D	4.00	2	2	2	7:00	6:30	90	(a)
18	Huntington to Bluffton	23 0	1	12		.75	.10	D	3.26	2	2	2	7:00	6:35	95	(a)
19	Indianapolis to Rockville	60 0	1	18		1.75	.10	D	2.91	1	1	1	7:00	7:00	180	*
20	Indianapolis to Southport	8 0	6	18		.15	.10	D	1.87	32	32	17	5:55	11:15	25	30
21	Indianapolis to Greenwood	12 0	5	18		.25	.10	D	2.08	36	36	17	6:15	12:00	30	30
22	Indianapolis to Greenwood	12 0	2	22		.25	.10	D	2.08	22	22	18	5:40	12:00	30	30
23	Indianapolis to Greenfield	22 0	2	18		.40	.10	D	1.81	15	16	11	5:15	11:10	*	(a)
24	Indianapolis to Knightstown	27 0	4	17		.65	.10	D	2.41	7	7	6	6:40	6:15	60	*
25	Indianapolis to Richmond	68 0	4	17		1.25	.10	D	1.84	4	4	4	7:20	7:50	170	120
26	Indianapolis to Plainfield	14 0	6	18		.35	.10	D	2.43	18	18	18	6:00	12:35	55	60
27	Plainfield to Greencastle	26 0	1	18		.60	.10	D	2.30	4	4	4	6:00	6:00	180	*
28	Indianapolis to Mooresville	17 0	2	18		.40	*	D	2.35	10	9	9	6:00	11:00	50	60
29	Indianapolis to Bloomington	58 0	4	10		1.50	.10	D	2.58	4	4	4	7:00	10:45	165	180
30	Indianapolis to Franklin	22 0	5	21		.40	.05	D	1.81	13	13	13	5:30	12:15	60	(a)
31	Indianapolis to Columbus	44 0	7	20		.90	.10	D	2.05	8	8	8	7:50	11:15	120	120
32	Indianapolis to Noblesville	28 0	1	16		.65	.10	D	2.32	3	3	2	6:00	7:45	90	240
33	Indianapolis to Ft. Harrison	10 0	4	18		.25	.10	D	2.40	19	19	19	5:00	2:45	45	105
34	Indianapolis to Shelbyville	28 0	3	18		.70	.10	D	2.50	8	8	8	6:30	12:10	70	90
35	Shelbyville to Greensburg	20 0	2	10		.60	.10	D	3.00	6	6	6	6:00	10:00	70	180
36	Shelbyville to Rushville	18 0	2	18		.60	.10	D	3.33	8	8	8	6:30	10:00	60	120
37	Indianapolis to Ben Davis	6 3	3	18-35		.18	.10	D	2.88	13	13	11	6:00	12:30	30	75
38	Indianapolis to Danville	20 0	3	23		.45	.10	D	2.25	7	7	7	5:30	11:30	60	90
39	Danville to Shades	20 0	1	10		1.95	1.00	D	5.13	2	2	2	8:00	7:45	120	(a)
40	Kendallville to Sturgis (Mich.)	27 0	2		7	.65	.10	D	2.40	4	4	4	6:30	10:00	90	240
41	Kentland to Reinsdear	29 0	3	18		1.10	.10	D	3.79	2	2	2	7:15	5:35	95	*
42	La Porte (City)	5 0	1	23		.05	.05	F	1.00	29	29	29	6:25	11:00	30	30
43	La Porte to Knox via Hamlet	30 0	1	23		1.00	.10	D	3.33	2	2	2	7:00	6:00	105	*
44	La Porte to Michigan City	14 0	2	18		.35	.05	D	2.50	17	17	17	5:45	10:30	45	30
45	La Porte to Hanna	18 0	1	18		.50	.10	D	2.77	3	3	1	7:45	6:05	65	*
46	La Porte to La Crosse	30 0	1	18		.90	.10	D	3.00	2	2	1	7:00	6:45	105	*
47	La Porte to Valparaiso	24 0	2	18		1.00	.10	D	4.16	3	3	3	7:40	9:15	75	*
48	Monticello to Kentland	25 0	1		7	1.00	.10	D	4.00	1	0	0	9:45	4:00	135	*
49	Mt. Air to Otterbein	54 0	2	10		1.50	.10	D	2.77	2	2	2	6:00	6:00	150	(a)
50	New Castle to Richmond	30 0	3	18		1.00	.05	D	3.33	3	3	3	5:00	7:55	100	*
51	New Castle to Connersville	32 0	3	18		1.00	.05	D	3.33	5	5	5	5:00	10:50	110	*
52	North Vernon to Seymour	15 0	1		7	.75	.10	D	5.00	1	1	1	1:25	6:45	60	*
53	Seymour to Valleria	15 0	1		7	.70	*	D	4.65	2	2	2	7:00	10:00	50	*
54	South Bend (City)	2 0	2	25		.07	.07	F	3.50	18	19	18	6:15	11:00	15	15
55	South Bend to Elkhart	16 0	6	22		.40	.10	D	2.50	5	6	4	5:30	12:00	60	60
56	South Bend to Buchanan, Mich.	17 0	7	23		.55	.10	D	3.25	5	6	4	5:30	9:00	50	*
57	South Bend to Cassopolis, Mich.	23 0	1	15		1.00	.15	D	4.35	2	2	2	7:30	6:30	75	(a)
58	South Bend to Dowagiac, Mich.	25 0	7	23		.75	.10	D	3.00	5	6	4	5:30	9:00	105	*
59	South Bend to Knox	41 0	2	18		1.20	.10	D	2.80	2	3	3	6:30	7:30	150	*
60	Knox to Logansport	48 0	2	18		1.30	.10	D	2.80	2	2	2	6:30	6:45	150	*
61	South Bend to Peru	65 0	9	20		2.35	.25	D	3.60	2	2	2	5:15	12:25	210	120
62	South Bend to Nappanee	28 0	2	18		1.00	.25	D	3.88	2	2	2	8:00	5:00	90	(a)
63	South Bend to Nappanee	28 0	2	18		1.00	.25	D	3.88	3	3	4	6:45	6:20	90	240
64	So. Bend, Court House to Rum Village	2 0	6	23		.08	.10	F	4.00	36	37	37	5:30	11:00	15	15
65	Tipton to Frankfort	23 0	2		7	.75	*	D	3.36	4	4	4	*	*	60	(a)
66	Terre Haute to Brazil	15 0	5			.50	.10	D	3.33	*	*	*	*	*	30	*
67	Valparaiso to Lowell	29 0	1	18		1.10	.10	D	3.79	2	2	2	7:00	6:05	95	*
68	Valparaiso to Wheatfield	24 0	1	18		1.00	.10	D	4.16	2	2	2	7:30	6:00	90	*
69	Vincennes to Bicknell	15 0	2	18		.50	.25	D	3.33	7	7	7	7:30	11:45	45	120
70	Vincennes to Sullivan	*	*	*	*	*	*	*	*	4	4	4	7:30	5:00	*	180
71	Vincennes to Washington	24 0	3	12		.60	.10	D	2.50	8	8	8	6:15	1:45	75	*
72	Waterloo to Byron	27 0	1	15		1.00	.10	D	3.70	2	2	0	6:00	7:45	105	*
73	Elkhart-Cassopolis-Dowagiac (Mich.)	32 3	2	15		1.25	.35	D	3.86	6	6	6	7:00	7:00	90	120

\* Information not available (a) Irregular.

the daily run and the passenger deposits the fare, or the token, as the case may be, in the fare box on boarding. The money is removed by a designated agent at the end of each day, counted, and placed in a safe place. This method has been found to be very satisfactory and the number of passengers carried can be ascertained for any particular run.

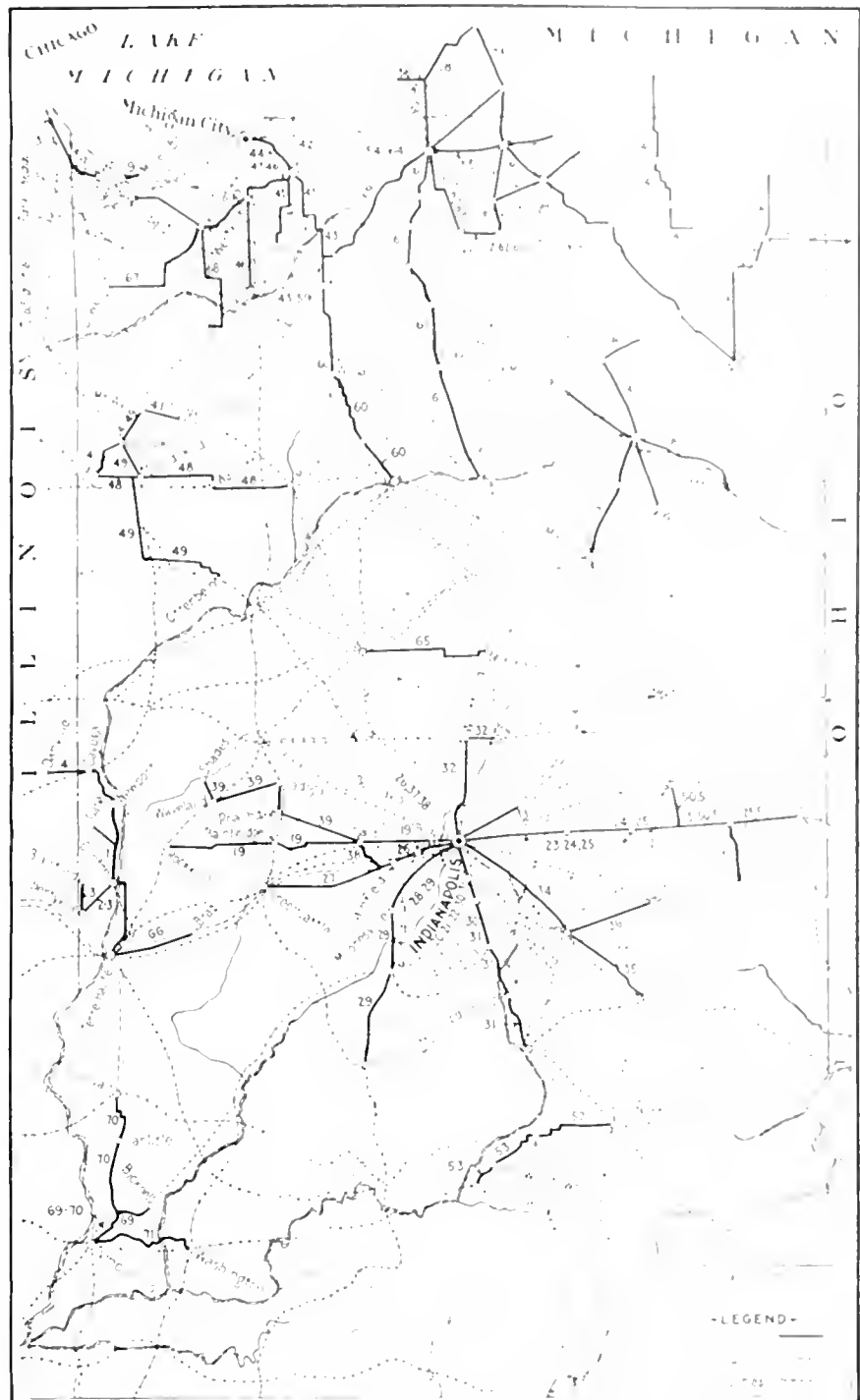
The rates of fare charged on the buses has been determined largely by the rate on the competitive line, namely, the electric line or the steam road, which runs through the territory served by the bus. The fare per mile ranges from 2½ cents to 4 cents, with an average for the entire state of 3.42 cents. Very few statistics

#### Indiana Transportation Facts

Population of state	2,930,390
Area, square miles	36,043
Land	34,900
Water	309
Cities with population	
100,000 or over	1
50,000 to 100,000	5
25,000 to 50,000	6
5,000 to 25,000	42
Total	54
Largest city, Indianapolis, population	314,194
Miles of highways	
Including city streets	3,706.70
Outside of cities and towns	3,281.04
Mileage of state highway system—total	3,280
Hard surface asphalt and concrete	280.05
Macadam	899.20
Gravel	1,827.28
Unimproved roads	173.47
Miles of bus routes	3,000
Number of routes	73
Number of vehicles	165
Inclosed buses	143
Touring cars	12
Miles of electric railways, Jan. 1, 1923	2,328
Miles of steam railroads, Jan. 1, 1922	7,426

are now available on the operating costs covering depreciation, gasoline, tires and insurance. However, most of the bus owners appreciate the significance of this factor in their operation and are laying plans to make a very careful study of the costs.

The extensive operation of motor truck lines and bus lines in the state, in such large numbers, is the best indication that the roads are as suitable for this traffic as in any section of the United States. While in some states there are more miles of the first-class roads, better known as hard surface roads, there is, perhaps, no agricultural district where the roads are more suitable for average transportation and in better condition than in a large portion of Indiana. Highway traffic naturally develops only where the roads are satisfactory. No better proof of the value of systematic maintenance of roads is available than the fact that 87 per cent of the bus line traffic is carried on the state roads. During the past year, the department of construction of the State Highway



The bus lines of Indiana naturally divide into two distinct groups: one running north and south and the other around Indianapolis. All but one of the bus routes operate 1,000 miles and use 165 vehicles.

Commission has completed the contracts on all sections of roads carried over from the preceding year, and early in the year awarded contracts for hard surface roads to the extent of approximately 117 miles. After making a careful inspection of all projects completed up to the end of the last construction season, this department realized that more attention must be given to the smoothness of surface of the hard surface roads. Consequently, during this last construction period an effort has

been made to obtain a smoother riding surface. This was accomplished by checking every foot of the green concrete with an 8-ft. straight-edge as soon as finished. All pavement was again checked when the entire project was completed and contractors required to correct all variations in excess of one-fourth of an inch under an 8-ft. straight-edge.

The State of Indiana, realizing the need of hard surface roads, has launched an extensive program of road construction for future years.

The bus owner or operator is to play a very important part in this construction program. By paying twice the usual vehicle tax, a \$3 seat tax, and 2 cents per gallon gasoline tax, it is estimated that 1,000 miles of concrete road will have been built in the state by the end of 1927. While certain parts of this tax seem to be very excessive, the bus operators appreciate the fact that good roads make for better business and lower also their operating costs.

No bus regulating legislation has yet been passed by the state. However, each owner is required to obtain a franchise for his route from the particular municipality which it serves. Legislation has, however, decreed that a license procured in one municipality will be sufficient for operation in any other part of the state. Previous to this enactment the burden of having a license in each village through which the route passed was becoming excessive, as it was not unusual for a single route to pass through as many as seven or eight municipalities in a short 15-mile run. It is also required by law that all buses carry insurance, both inside and out, to the extent of \$10,000 per vehicle. This has introduced a problem which the bus operators are very anxious to solve, as full coverage bus insurance at a reasonable rate is one thing that all operators are very desirous of carrying.

No one, perhaps, in the state has made a more careful study of bus operation than A. E. Jahn of La-

porte. He has established a garage and maintenance system and keeps four mechanics busy in Laporte, one at South Bend, and also one at Elkhart for emergency purposes. All drivers are instructed to report promptly any indication of a failure, which may cause interference with schedules. The bus is immediately pulled out of service and repaired. Operating a fleet of twenty-one buses as he does, it is always possible for him to have one or two off duty for a few hours in the day, for inspection and repairs. By this method he has produced a continuity of service which has enabled him to build up a successful business, and adequately to serve the people in the territory through which he operates. His line operates 2,600 miles per day at an average fare of 2½ cents per passenger-mile. It has been his practice to build constructively on each route as he has acquired it.

In closing, it is well to state that the bus industry in the Hoosier State has just started to develop and the future will bring forth the latest in motor transportation equipment. Plans are now under way for a line from the northern part of the state into the capital, Indianapolis, with limited service. Stops will only be made at large towns at established bus stations. It is planned to give the riding public the very finest of service and equipment. The very near future will see a similar deluxe line operating south from the capital which will carry through passengers.

However, no bus or truck job should be considered complete until it is properly equipped with spares. This is where the dual has a decided advantage in that only one tire and tube is needed for spare tire equipment, while on the single-tire job two tires and tubes, one 36x6 and one 40x8, are required. This adds only \$88.75 to the dual-tire cost, while to the single-tire job a cost of \$253.90 is added. The total costs thus would be:

Dual-tire bus with spares.....	\$621.25
Single-tire bus with spares.....	761.70

The ultimate cost of tire equipment is the bus-mile, or more properly, the passenger-mile cost. These costs depend on the mileage delivered by the tire as one factor. Some enthusiasts would lead us to believe that, without a question, dual tires will deliver more miles than single tires. This is true only under certain conditions. Our tests indicate that about the same mileage may be expected from duals as from single tires. In some cases the average mileage will be less on duals.

To start with, dual tires have the advantage in load-carrying capacity. The maximum recommended load for two 36x6 tires is 4,400 lb., as compared with 4,000 lb. for one 40x8 tire. The extra load for the dual equipment is 400 lb. per wheel or 800 lb. per rear axle. This is a distinct advantage on buses subject to high peak loads, with all sitting and standing room taken several times a day.

Dual equipment is interchangeable, front and rear, therefore the tires which become somewhat worn on the rear may be changed to the front to be worn out, which will tend to increase the average tire mileage. This is not possible on the single-tired job.

It is essential that great care be taken to keep the air pressure equal at all times, in both the inside and outside tire of duals. If not, the tire having the greater air pressure will carry the brunt of the load. This will cause early fatigue, which means a low mileage performance. The great importance of this fact should never be lost sight of.

Dual tires should be frequently reversed, putting the inside tire on the outside and the outside tire on the inside. This has been found to be especially necessary where the bus is operating over crowned roads or narrow paved roads where there is a drop at the edge of the pavement.

## Dual Versus Single Pneumatic Tires

BY R. D. ABBOTT

Tire Testing Department the Miller Rubber Company, Akron, Ohio

DUAL pneumatic tires are most popular and thus far are used to the greatest extent in the passenger bus business. Perhaps the main reason for that is that they lower the center of gravity of the bus. For example: single 40x8 tires are replaced by dual 36x6 tires; this brings the body of the bus some 2 in. nearer the road. Manufacturers have made rapid strides in building bus chassis which are underslung or semi-underslung. They are using dual 36x6s in place of 40x8s in their design of low, one-step buses which sway and tip very little. To meet this demand the 20-in. rim diameter tire has recently been developed. This enables low single-tired as well as low dual-tired

buses. Consequently in the future the determination of whether dual-tire or single-tire equipment should be used will be less and less influenced by the lower center of gravity argument. Up to the present time this has been a powerful argument in favor of duals.

The initial cost of dual tires is less than that of single tires, when spares are included. For example:

DUAL-TIRED BUS		
Six 36x6 cord tires at \$78.05.....		\$468.30
Six 36x6 tubes at 10.70.....		64.20
Cost.....		\$532.50
SINGLE-TIRED BUS		
Two 36x6 cord tires at 78.05.....		\$156.10
Two 36x6 tubes at 10.70.....		21.40
Two 40x8 cord tires at 146.65.....		293.30
Two 40x8 tubes at 18.50.....		37.00
Cost.....		\$507.80

On crowned roads the inside tire is always carrying more than its share of the load. This gives the same effect as having the outside tire under-inflated. We have followed loaded buses for miles on narrow paved roads with a drop off at the edge when almost half the time the outer tire would be hanging off the pavement and the inside one carrying all the load. The effect on the inside tire is obvious. Under such conditions, unless frequent reversals are made, the dual mile average will be less than the single-tire mile average. Some operators have tried to overcome the ill effects of crowned roads by different inflations of the inside and outside tires. The theory of this is good but the practice dangerous unless carefully carried out.

Do not put on new and used tires as mates. A new tire may stand almost an inch higher than an old tire. This will cause the new tire to carry all the load until it wears down sufficiently to permit the old tire to function as a load carrier. In such a case the new tire will be short-lived.

With certain wheel equipment, under-inflated dual tires may chafe against each other and wear out the side walls. While not as serious as the premature fatiguing effect of under-inflation, this is another objection to under-inflation.

Dual tires should be frequently inspected for the lodgment of stones or other hard sharp foreign objects between the tires. These eventually cut through the tires, necessitating costly repairs and delays on the road.

Skidding is less with dual tires than with single. On a wet pavement the outside tire wipes the pavement dry so the inside tires will obtain friction enough to stop the skid.

If one rear tire is punctured or cut through the bus may pull out of traffic and run some little distance to a convenient place for a tire change without material damage to either tire. This would be impossible with single-tire equipment. However, it is bad practice to run miles to the next station before a tire change is made. The one tire carrying a double load is having its life sapped out so fast that the final mileage it delivers will be way below what it might have been.

It is of particular advantage in bus service when one of the rear tires goes flat not to have the bus sag several inches after the passen-

gers have been startled by the blow-out. A number of instances have been noted where such an occurrence with single tires has resulted in a loss of business for several days.

From the above discussion it may be seen that there are many points in favor and against the use of duals. This indicates the necessity of careful thought on the part of the tire user in selecting tire equipment, and of intelligent use thereafter.

### Tires Average 50,000 Miles in Western Service

MILEAGES of 50,000 and upward are being secured, it is said, from 38 x 7 tires on Western stages. The close-up shown here is of a stage operating over the 41-mile route from Seattle to Tacoma and which is



Close-up of 38 x 7 Armstrong tire after 40,000 miles on Washington stage

equipped with 37 x 5 tires in the front and with 38 x 7 in the rear. At the time the close-up of the tire was taken it had been in service from the first part of September, 1921, to the latter part of February, 1922, covering about 40,000 miles. The same tire was used and was not taken off its original wheel until the middle of the following June. The mate to this tire, mounted at the same time, delivered about 60,000 miles.

In answer to a question as to the operating conditions, the Fox Armstrong Tire Company, Seattle, Wash., informed BUS TRANSPORTATION further that the inflation pressure carried in the two tires was 120 lb. per square inch. They were always used on the same wheels as originally mounted.

Without load, the stage on which they were applied weighed 7,025 lb. The highway used is asphalt, concrete and brick, with about an equal mileage of each type of construction.

At the time the mileage referred

to was obtained the stage was owned by the Tacoma Union Stage Lines. It has since been acquired by the present operator, the Park Auto Transportation Company.

### New Orleans Department Store Operates Bus Lines

THE Charles A. Kaufman Company, operating a big department store at Dryades and Poydras Streets, New Orleans, La., has acquired and on April 22 started to operate five buses of the Mack International Truck Company type, each with a seating capacity of twenty-five passengers. The route is from Canal Street, the main boulevard of the city, to the store of the company in the upper part of the city. The cars are run without charge to customers of the store. In the evening they are kept waiting outside the store at closing time and take twenty-five passengers each over a route to the Algiers Ferry for those living on the other side of the Mississippi River.

### How to Save Fuel

EXPERIENCE has singled out the following points as of utmost importance in fuel conservation. They represent the condensed opinion of a number of men who have devoted most of their lives to maintenance and operation of motor vehicles.

See that the engine pulls fairly well. Make sure the clutch does not slip.

Test the bus and see that it coasts freely. If it does not it is more than possible the brakes are binding. Then report this condition on your report card.

Make sure there are no leaks in the gasoline tank, or in the gasoline line. A great quantity of gasoline can escape through a very small hole.

See that the carburetor does not flood. Remember that flooding it means a loss of fuel, as its reservoir will hold only a certain amount of gasoline and the surplus overflows to the ground and is waste.

Always coast as much as possible and in coming to a stop coast as much as you can. It will save gasoline, save the brakes, and prevent jarring of the vehicle with consequent discomfort to the passengers.

When coasting shut off your engine. Do this also while on the stand at terminals for over two minutes.

Old drivers should help us to interest and educate new drivers to save gas.

Your experience in fuel conservation is invaluable. If you want to try any other carburetor adjustment other than what you have, tell your mechanical foreman about it and you will find that he will be only too pleased to co-operate with you.—From "Motor Coach," published by Fifth Avenue Coach Company, New York.

# BUS TRANSPORTATION

Published by McGraw-Hill Company, Inc.

CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, June, 1923

## *Always Be Careful*

**A**LBUQUERQUE recently took off mourning. The flags there were for a while at half-mast. One man died. The hospital list was nine. Despite the miracles performed by the surgeons several people will go through life maimed and scarred. Why? Because the operator of a bus was careless. One and one-half miles west of Emerald on a recent Sunday night while driving at high speed on a wet road he lost control of the car. It went over the bank and fell down on the tracks of the Burlington Railroad. Fourteen passengers were carried over with it. The miracle is that the operator of the machine was the only one killed instantly.

It is, indeed, a sad task to have to set down facts such as these. But as long as people take chances newspapers will be forced to record tales of sudden death and newspaper men to write stories and editorials that make them shudder as they unfold the grim details. And they are unfolded only for the sake of the lesson that they carry to others.

At a recent meeting held to consider safety, at which many suggestions were offered about accident prevention, a little man at the rear of the room, called upon toward the close of the meeting, said just three words. He then sat down. But he packed into those three words the philosophy of the whole safety movement. These words were: "Always Be Careful." If this admonition were always heeded, there would be fewer deaths by accident, fewer injuries and little or no need for preaching sermons such as this.

— [ EDITORIAL ] —

## *Play Safe at Railroad Crossings*

**F**ROM now on traffic over the highways and over the railroads will call for increased summer service. The motor bus owner will increase the number of trips per day over his route and the railroads will put on more trains. This increase in traffic likewise makes the railroad crossing all the more dangerous as the chances for crossing accidents increase in direct proportion to the increase in train service.

This year, like last year, the railroads will placard

both sides of every one of the quarter of a million railroad crossings in the country. Thus they are doing their part in calling attention to the dangers involved.

The bus operator has an even greater responsibility because of the human freight he is carrying. Before passing over a railroad crossing he should always assure himself that everything is clear. This should be an invariable practice, even in states where the law does not require drivers to "Stop, Look and Listen."

The bus driver has no right to approach any railroad crossing at such speed that he cannot stop before passing over it. He ought to know the location of all the crossings on his route, and no excuse ought to be accepted by his employer for failure to observe "Safety First" at these points.

Many automobile associations, boards of trade, chambers of commerce, local, state and national, have adopted resolutions to aid the railroads in their humanitarian efforts to make these railroad crossings safe. Bus operators should join in this movement, and as a representative of the motor bus industry BUS TRANSPORTATION urges them to apply stringent and unwavering discipline upon drivers who fail to protect their patrons at railroad crossings.

— [ EDITORIAL ] —

## *Look for Better Braking Systems*

**T**HE question of how to reduce brake maintenance costs has been studied thoroughly by thoughtful operators, because this item is unreasonably high and out of all proportion to the maintenance of other parts of the stage or bus. The problem is most acute on systems that operate over heavy grades and rough roads. The Yosemite Transportation Company, for example, operating in the Sierra Nevada Mountains of California, adjusts brakes with expert care every night and yet is obliged to renew linings every 1,500 miles. Braking is also a troublesome problem in many city services, where stops are frequent, either for passengers or on account of traffic conditions.

Because the cost shows up in the renewal of linings and in adjusting brake bands to worn linings, it is natural that operators should first hope for a new and better lining. There are good linings already on the market, however, and possibly they might be all that could be desired if other parts of the braking system worked as well. The point is that the stage and the bus are new, and braking systems suited to the service required have not yet been developed. Brakes suitable for touring cars or for trucks are not adequate for the stage with the weight of a truck and the speed of the pleasure car, nor are such brakes sufficient even for the lighter stages where constant and heavy duty is required.

Too often present mechanisms are laid out so that as the rear springs open up or are deflected the result is "grabbing," dragging and excessive lining wear. With heavy, speedy vehicles on rough roads this becomes serious and linings wear out very quickly. Of course still better linings may be produced, but the weakest point in the present brak-



ing system as adapted to stage service lies in the brake rods and connections, rather than in the lining, and it is only common sense to strengthen the chain at the weakest point.

The operators of today urgently need better braking facilities, and it is safe to say that something much better than the present systems can be produced. Already several braking systems are being developed expressly for stage and bus service; some for two- and some for four-wheel application. These and any other new ideas along the same line must be given a fair trial. Because there is an economic need for this improvement, it is sure to come, but it will come all the sooner if bus and stage companies will do what they can to aid in the development and will maintain an open-minded willingness to try out new brake systems that promise both safety and economy.

— [ EDITORIAL ] —

### *Conveniences Are Necessary for Bus Line Patrons*

**S**TRANGE as it may seem, there are many towns, even large cities, throughout the country that as yet are not awake to the fact that the motor bus lines coming into their city from suburban points are of direct benefit to local business.

These buses bring in every day thousands of persons. Most of them come to make purchases of one kind or another, and investigation has shown that the bus patron who pays 50, 75 cents, \$1 or more bus fare does not go on a shopping trip that has but a total expenditure of a dollar or two. Instead, the average bus passenger's shopping bill is estimated at about \$10. This business means a lot to the local merchants.

The bus lines themselves do not need subsidizing. That is not the argument. They must make their own way or fail. The point in question is that terminal facilities are needed for the best development of this form of transportation. Co-operation on the part of the city is also needed. The bus owners are ready and willing to provide additional service and more buses as fast as the traffic demand warrants. The volume of business to be gained will not swamp their lines.

In this issue is an article on the location and design of bus terminals for intercity routes. The article merely attempts to outline the main essentials of an intercity bus line terminal station, where loading and unloading of traffic are done on its own property. The general layout, however, is amenable to many variations, depending on the size and the arrangement of the plot of land which is to be used.

It is essential, however, that before establishing an intercity terminal it be started right, and a discussion of these suggestions, either from a practical or a theoretical standpoint, is invited in the hope that all angles may be covered. With such consideration given, those who are planning the building of such facilities, either co-operatively or backed up by civic bodies, can have the benefit of the latest thinking on the problem.

### *Some Practical Plans for Lowering Liability Rates*

**T**ODAY'S laws in many states require that bus owners carry liability insurance as a means of protection to their patron. Undoubtedly these laws have reacted favorably to the business of the insurance companies.

The bus owner, however, often complains because the premiums demanded are high and the amounts the same, even though the risk involved in different parts of the country, let alone the same state, are not at all similar. Many an operator has pointed out that he never has had an accident involving a loss of any kind during the many thousands of miles his bus has been operated. Others say the average loss does not reach \$75 annually.

Then, too, the bus man has failed to comprehend why his bus, standing all day or even week in the garage, has had to carry insurance at full rates, when there was not the remotest chance for a claim.

There has, of course, been some consideration given to this phase of the subject and the insurance companies have established the payroll basis of computing the premiums. That they can go even farther and base it on a bus-mile or bus-hour unit is a reasonable request if this class of business is desired. This basis applies only to the large fleet owner and is of no help to the operator who owns only two or three buses.

He is being assisted now, however, by the various bus associations, which are giving attention to the subject of insurance. There are now two associations, one in New York and one in Ohio, working out plans for carrying their liability insurance under the so-called mutual plan. In New York arrangements are being made with an established company, this company to keep all bus accounts separate with a view to establishing reasonable rates. In this way the contention that the bus owner is a much better risk than generally indicated by premiums charged is likely to be proved. In Ohio the association has gone even further and plans to establish its own insurance company to save commissions and brokerage fees.

These insurance operations will be watched with a great deal of interest, not only by bus owners and other organizations but by the stock insurance companies. Their success may result in having liability rates in other states materially reduced wherever the bus men can show that the risk has been improved because of a better operating organization.

— [ EDITORIAL ] —

### *A Good Reason for Cost Keeping*

**T**OO common is the situation today where bus fares have been fixed merely by some chance circumstance connected with the inauguration of service—perhaps by competition with the street cars, or perhaps by some one's guess as to "what the traffic will bear"; very seldom have they been developed in such a way as to stand rate-making tests which are now generally accepted as correct by public utility experts, commissions and by the courts. Rate regulation in general is here, and in

some places the authorities have already begun to restrict the freedom of bus operators in the making of rates. The motor bus owner must prepare himself to figure fares on some sound basis. It is time he gave some real thought to the matter. Else he will find that his profits fail to materialize if fares are too low, or that the public will demand and probably force him to lower rates unless he can justify his existing fares on the sound basis of cost of service in public utility language which includes a fair return on the investment.

Every other transportation agency has had to meet these conditions of public regulation. And it is reasonable that it should be so. As a public servant a transportation company is entitled to earn its operating costs plus a fair profit. The public will not begrudge the enterprising promoter and the efficient operator a just reward for his services, but the public "must be shown."



## Co-ordinating Bus and Electric Railway

NEW YORK, N. Y., May 17, 1923.

To the Editor:

It seems to me that Mr. Emmons' paper, as given recently before the Society of Automotive Engineers (see BUS TRANSPORTATION for May, page 238), is an attempt to justify the attitude of the electric railway industry that the motor bus has no place in our transportation system except as a feeder or auxiliary, but that it cannot take the place of the electric railways, because it cannot handle mass transportation except at a rate of fare far beyond the electric railway rate for the same service.

Mr. Emmons does not produce any real operating or cost figures to substantiate his contention. He merely contents himself by stating the experience one or two cities have had in an attempt to handle surface passenger traffic with buses after the railway company had ceased operating. He should know that in the instances he cites no predetermined, well-thought-out, organized bus system with the proper kind of equipment had been inaugurated.

As a comparison of capacities, Mr. Emmons refers to bus operation on Fifth Avenue, New York, taking for his text a *Saturday Evening Post* article by Edward Hungerford. Mr. Hungerford is a writer in the popular sense on transportation subjects. Mr. Emmons is the chief executive of one of our large electric railway systems and president of the American Electric Railway Association. He is in a better position to have and to state the facts, yet Mr. Hungerford's statement is more in keeping with them. Mr. Hungerford claims 180 buses an hour in the rush—Mr. Emmons only 149. Official New York Transit Commission counts show 188 in the heaviest morning rush hour and 176 in the heaviest afternoon rush hour. Mr. Em-

mons then goes on to compare the Fifth Avenue bus operation with other methods of mass transportation, stating that seven ten-car subway trains or forty-five modern two-car surface trains could have carried the number of people the buses were carrying.

No one contends that buses can compete with subway trains, either in capacity, speed or cost of operation. A subway probably could be constructed under Fifth Avenue. On the other hand, I do not believe Mr. Emmons or any other street railway man could operate forty-five two-car surface trains through Fifth Avenue's dense traffic with heavy traffic cross-streets every 200 ft. in ninety minutes, and in this particular instance he would find that his costs would exceed the costs of the Fifth Avenue Coach Company.

This brings up the point that, because of the flexibility of the bus, it is more adaptable to dense street traffic conditions than are surface cars, and for this reason many surface car operations will have to give in to buses. The streets of our cities are becoming more and more congested every day. In most instances, because of the cost, additional streets cannot be provided, and those who will study the street traffic problem will conclude that the slow moving, larger and inflexible surface car is responsible for most of the congestion. Now that a more flexible, as cheaply operated and equally dependable and capable means of surface transportation is at hand, in the form of the motor bus, the surface car must pass out.

In Manhattan the Fifth Avenue buses seat 25 per cent more than the surface cars, are 20 per cent faster, occupy but half the street area, have fewer accidents per mile and cost less to operate. And the present Fifth Avenue bus is not the latest type of equipment. An investigation conducted under my supervision showed that the total operating costs, taxes and fixed charges for the Fifth Avenue Coach Company for the year ending June 30, 1921, was 46.49 cents per mile as against 88.8 cents per mile for the Manhattan street railways; that during this period, 31,836,439 car-miles were operated, and that only 36,280,470 bus-miles would have been necessary to furnish every one with a seat during the rush hours, taking into account maximum loads at maximum load points. With bus operation on a 5-cent fare, the car deficit of \$3,244,133 would have been turned into a bus profit of \$11,254,578. This investigation showed other similar pertinent facts.

There is more traffic on Fifth Avenue than on any other street in New York City, yet the buses operate at a 20 per cent greater speed than do the surface cars. On Chambers Street, where cars formerly operated and had great difficulty in getting through at all, buses now operate at a 66 per cent greater speed than did the cars.

Buses can handle mass transportation in many, many instances at a rate of fare comparable with surface cars. In Newark, N. J., last year, the buses handled 80,000,000 passengers at a 5-cent fare, whereas the Public Service Railway Company charges an 8-cent fare and 2 cents for a transfer. And the Newark buses are for the most part in-

dividually operated and generally of a small and unsuitable type. These Newark buses have been doing business for a number of years.

Because of the flexibility of the bus, it can often meet rush-hour conditions better than surface cars. One bus can pass another; they can be short lined at any point, held at any point without blocking the entire line, etc. The latest type of double-deck bus seats seventy passengers, and a bus can carry standees just as well as surface cars. The recent investigation by the New York Transit Commission showed that per seating capacity the buses, supervised by the city, carried as many standing passengers as the most crowded New York subway trains.

Following Mr. Emmons' example, permit me to do a little quoting from a more or less popular source, but from one more significant than any Mr. Emmons has used. The *Wall Street Journal* of Feb. 19, 1923, devotes a whole column under the heading "Motor Bus Service May Menace Street Railways," reaching this conclusion after a comparison of bus and car operating and fixed costs which it sets up in the article, which closes as follows: "If above figures are sustained by experience as generally applicable the trolley must overcome a severe handicap if it is to successfully compete with motor bus systems in the future. On the trolley system profits must exceed those of the motor bus system more than nine times to meet fixed charges. In other words, the trolley system must carry more than nine times as many passengers, assuming the same fare, before it begins to show profits available for dividends, after meeting operating expenses."

It is natural that anyone should at first be antagonistic to anything threatening his business. If the threat persists, the next step is probably to capture it and use it to the best advantage. For many years the street railways pooh-poohed the motor bus, but now, because it is beginning to prove itself, they are giving it some consideration on their own account; later on they will adopt it as their own, improve it and root for it, simply because it is economically sound.

F. VAN Z. LANE,  
Consulting Transportation Engineer.

—[LETTERS TO THE EDITOR]—

## Systematic Cost Accounting Will Cut Operating Costs

PORTLAND, ORE., April 27, 1923.

To the Editor:

What, if anything, has been done to formulate a uniform accounting system for bus lines, referred to in the editorial in the March issue of *BUS TRANSPORTATION*?

I would be glad to get together with accountants of various lines on such a plan, believing it will do more to stabilize the industry, assist operators to improve their service and increase profits than can be done by each operator adopting his own system or having no books at all. I refer chiefly to operators having no books, knowing a good many in that condition in Oregon.

The Public Service Commission of Oregon recently outlined a uniform system to be installed by Oregon lines. A double entry system of books must be kept by the larger lines, while small operators must keep certain records and are relieved of keeping books. All lines must keep statistics relating to passengers carried, tonnage carried in cases of freight lines, and mileages covered during the year.

This will give the commission much valuable information, but the system prescribed does not obtain enough information for the operator. What should the operator object to knowing which cars are making profits for him and which show losses? The same applies to routes, schedules, etc. The small operator might believe that such detailed accounting would cause too much work, but I believe he has an advantage over the larger operator inasmuch as his analysis of expenses could be watched with much less effort than could be done by a larger operator owning a number of cars.

The larger operator with several makes of cars might wish only to know what make or type of car costs most to operate. This would enable him to weed out expensive cars and standardize his equipment, as has been done by a few large lines. For a line having standardized equipment, the management might want to keep costs by models in order to tell which model car is most expensive to operate. An older model must surely be more expensive to run than a new car. By setting aside a larger amount for depreciation or by selling these older cars, either for cash or on a trade-in for later models, an operator could possibly save money. But who knows these facts close enough to be guided accordingly without adequate cost accounting.

The attitude of a few operators with whom I have spoken is against accounting other than what is necessary to file income tax returns. How could they expect to compete for any length of time against a well-organized company? It is my opinion that no business man operating on a small scale realizes the value of a good set of books until he has had them installed and receives results. Such men are the best boosters when facts are placed before them.

I believe that through co-operation among lines much good can be done, and I always look forward to receipt of my next copy of *BUS TRANSPORTATION* to see what others are doing. I would be glad through your columns to hear from accountants of other lines regarding what they are doing.

ROY H. SWINT.

—[LETTERS TO THE EDITOR]—

## Anent the Albany Trip

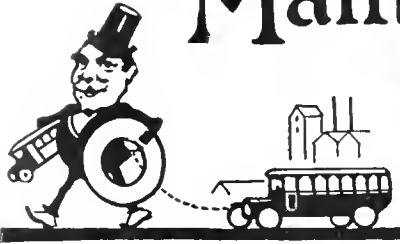
NEW YORK, N. Y., April 29, 1923.

To the Editor:

I wish to inform you of a mistake in the April 1923, issue of *BUS TRANSPORTATION*. Under the heading "New York City Buses Invade Albany," not a Reo but a special bus type, Model 50 White, owned and driven by me, reached Albany. The Garford and White are from the Eighty-sixth Street crosstown line, since there is no line on Eighty-ninth Street.

FRANK MILLER.

# Manufacturers' Section

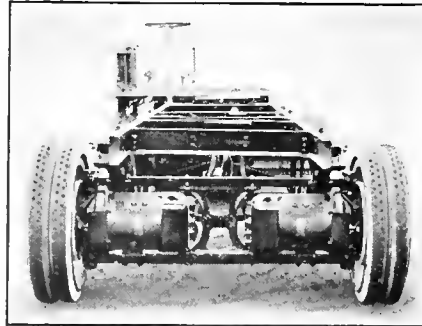


Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## New Trolley Bus Has Four-Motor Drive

THE Trackless Trolley Company of America, New York, N. Y., has brought out the thirty-two-passenger trolley bus shown in the accompanying illustration. The novel feature of this is the power application, since there are four electric motors, forming an independent driving unit for each road wheel. The drive is of a type that has been used for years by the Commercial Truck Company of Philadelphia on storage-battery trucks. Known as the concentric gear unit drive construction, it consists of a pinion mounted on the shaft of the electric motor and an internally cut gear attached to the road wheel. The drive between the two is by means of three pairs of intermediate gears, these being supported by spindles mounted on the road wheel and providing a double reduction between the motor and the road wheel.

Advantage claimed for this type of drive are that it gives maximum



*Rear view showing the motive power of new trolley bus*

traction, driving strain is distributed evenly over the chassis, parts are interchangeable on the four wheels, and in case of accident to one motor unit it can be disconnected and the vehicle can proceed on the power from the others.

The individual motors are of the General Electric ventilated type, 14 hp. each, and rated at 35 amp. at 300 volts. The pair on each axle are connected permanently in series, while the four motors are connected

in series to start, and then in parallel for running. Each motor is supported in a steel casing, which in turn is held in the built-up construction forming the axles.

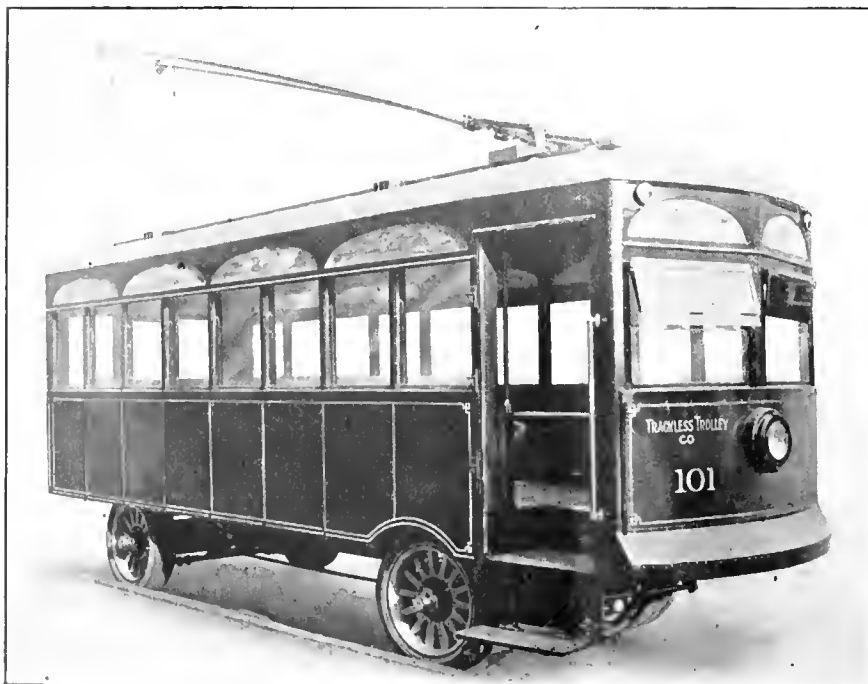
Control equipment consists of a master controller and separate reverser, eight contactors controlling the main circuit, and two resistors. This master controller is the only unit in the bus body, all the heavy wiring and main circuit contacts being kept underneath. Either foot or hand operation may be applied to the master controller. An automotoneer with three notches, placed at the first point, the full series point and parallel point, permits the controller to be advanced, either step by step in the regular way, or if the bus is in motion it can be advanced in three steps, thus relieving the driver of unnecessary notching. The reverser is hand operated and interlocked in the usual way with the controller.

Two trolley poles are used, each mounted in a separate base, and equipped with a swivel harp and V-grooved trolley wheels furnished by the Ohio Brass Company.

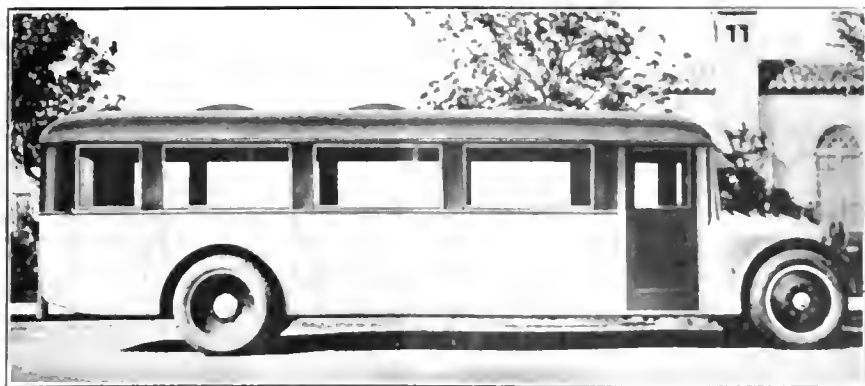
The body shown in the illustration was built by Remmele & Maier, Newark, N. J., according to the specifications of the Trackless Trolley Company of America, and follows standard practice in up-to-date bus body construction. It is electrically heated and lighted, with thorough ventilation facilities. An electric push button is placed at each seat as a stop signal. The length over all is 23 ft. 4½ in.; width, 7 ft. 6 in.; and height from ceiling to floor, 6 ft. 8 in. The chassis includes worm-and-sector steering gear, semi-elliptic springs all around, and brakes of the internal expanding type on all four wheels. Wheels are of the 36-in. artillery type, fitted with dual cushion tires.

It is said that the power consumption of this vehicle is about 1 kw. per car-mile. Its free running speed is 20 m.p.h. Chassis weight, including motors, controllers and all electrical equipment, is about 7,100 lb. The weight of the body will vary with the type of construction and the material specified.

The vehicle herein described was designed by Charles Berg, president of the Trackless Trolley Company, and formerly vice-president of the Commercial Truck Company, of which concern he was one of the organizers.



*Thirty-two-passenger trolley bus developed by Trackless Trolley Company of America*



*Fageol sightseeing bus. Seats twenty-eight passengers, in addition to driver.*

### Sightseeing Bus Has 49-In. Windows

A NEW limousine-type sightseeing body on the Fageol bus chassis has been announced by the Fageol Motors Company, Oakland, Calif. The new bus seats twenty-eight passengers. Its outstanding feature is the size of the plate-glass windows in the sides, these measuring 49 in. in width, and 23½ in. in height, giving the passengers a greater area of unobstructed vision than has been provided in closed cars in the past.

The car has been planned to attract the cream of the tourist trade, and consequently many features of luxury and comfort have been incorporated, such as Gruss air springs at both the front and the rear, and leather upholstered spring seats so arranged that the occupants do not interfere with each other's vision. Heating, ventilation, and lighting have all been provided, and the general finish of the car is such that the operator will be justified in charging a higher rate for his tickets than can ordinarily be obtained with the open or "rubberneck" type.

Orders for the new bus have already been placed by the Parlor Car Tours Company, Los Angeles, Calif.; Jefferson Highway Transportation Company, Minneapolis, Minn.; Original Stage Line, San Fernando, Calif.; and by operators in Duluth, Minn., and Atlantic City, N. J.

### Drive Unit for Six-Wheel Chassis

THE Wisconsin Super-Traction Truck Sales Company, Madison, Wis., is offering a drive unit consisting of two worm-gear rear axles, connected in tandem, which is recommended for converting standard chassis into six-wheel outfits. The

company also supplies a complete vehicle of the six-wheel design, the novel feature being the two sets of axles at the rear.

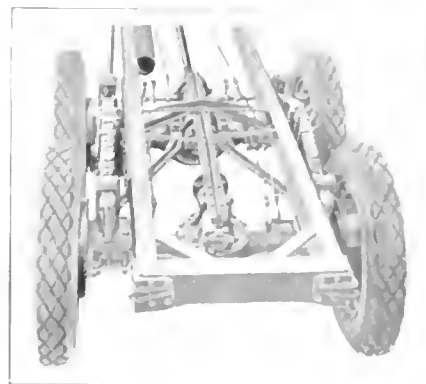
With this construction, a large bus chassis can be fitted with 36x6-in. single pneumatic tires all around, instead of requiring 38x9 on the rear wheels. It is said also that the traction and braking ability are considerably increased, as compared with the standard construction.

The drive consists of two Wisconsin rear axles of the worm-gear type, with 8:1 to 1 reduction, and coupled together by a short drive shaft with fabric joints at each end. The front driving axle is held in alignment by radius rods attached to the frame, while the rear axle is made a working unit with the front axle by means of a special radius rod and torque beam construction, which is said to secure flexibility without any possibility of disalignment.

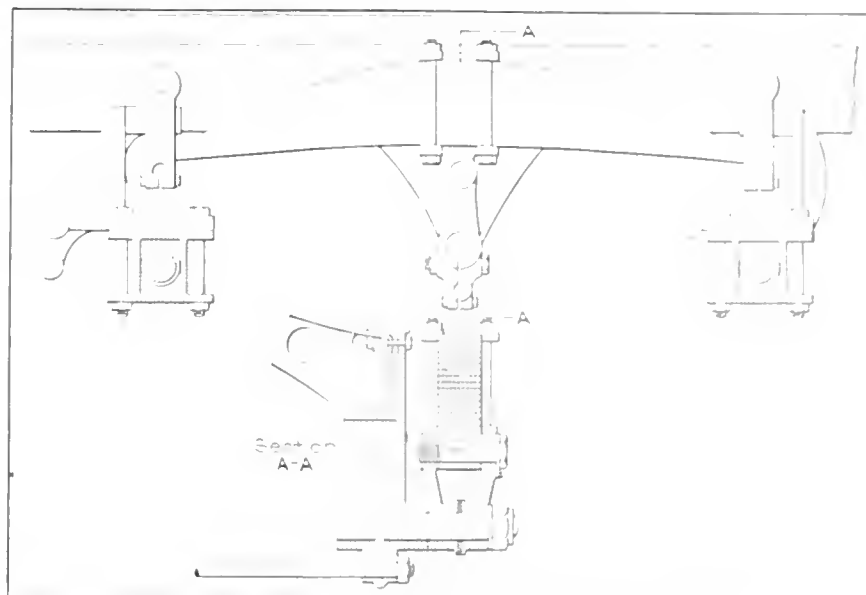
On account of this torque construction, the springs are relieved of

driving strain and merely carry the load. While the conventional type of semi-elliptic springs are used, these are inverted, with the highest part at the center and the ends above the two axles. At the center, these springs are suspended in ball-bearing shackles, shown in the drawing, thus relieving them of twisting strain, to which they would be subject from the flexibility of the two rear axles. The drive unit construction includes brackets fastened to the outside of the frame, which project below the frame members, and to which the central parts of the springs are clipped. To take the weight of the drive units, the frame is reinforced by a heavy cross member.

Brakes on the two sets of axles are connected in pairs, so that the control is the same as with the standard construction. As shown in the illustration, the brakes work in pairs; both emergency and service are hooked up in tandem.



*Wisconsin drive unit, consisting of two worm-gear axles hooked up in tandem.*

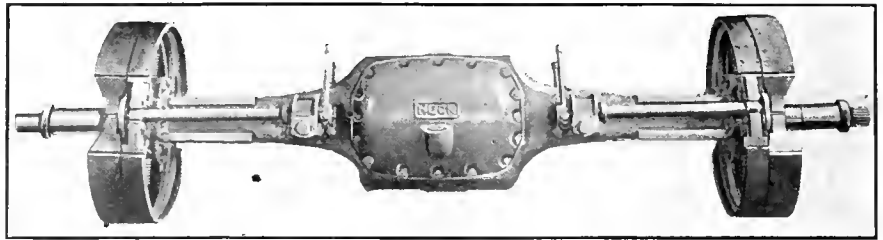


*Ball-bearing spring suspension used for drive unit.*

## Bus Axle Has Novel Double Reduction

THE Huck Axle Corporation, Chicago, in addition to a line of double-reduction axles for motor trucks, is producing a bus axle. This is known as Model 85, and uses the planetary principle for the final reduction. It has the wide gage characteristic of heavy duty buses, 74½ in. with 1¾-in. wood disk wheels, and 75½ in. with 2½-in. spoke wheels. The outside width is 90½ in., with spring centers which may be varied from 47 to 53 in., using 3-in. springs. Total gear reductions may be furnished as follows: 5.72 to 1, 6.65 to 1, 7.36 to 1 and 8.45 to 1.

All the driving mechanism is mounted as one removable unit in the center of a one-piece axle housing. The housing is symmetrical

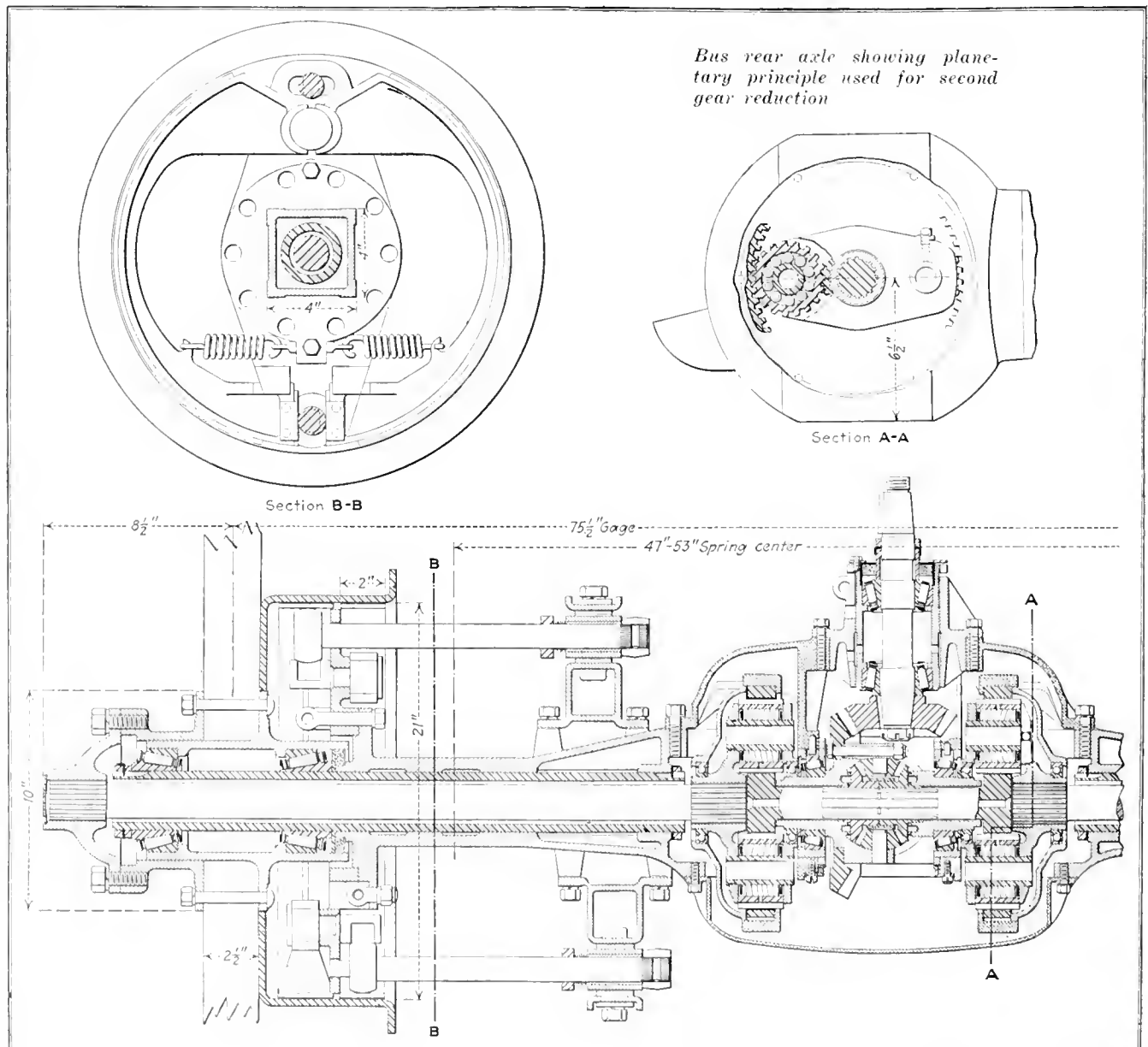


*Huck bus axle Model 85, for 75½-in. wheel gage*

and gives ample head and road clearance. The first reduction is of the spiral bevel type, this including a differential carrying short splined shafts at the ends of which are integral spur pinions. As shown in the accompanying cross-section, each of these pinions drives two planetary gears, the latter mounted on roller bearings carried by a driving spider that rotates around the central axis. The action of this driving spider is

caused by the turning of the planetary gears which mesh with a fixed internal gear. The internal gear is rigidly anchored to the Lynite differential carrier. The drive spiders transmit their driving action through sixteen-spline fittings to the axle shafts and, in turn, through the hub flange to the wheels.

According to the manufacturer, the central housing is dustproof and oiltight, so that all gears run in a





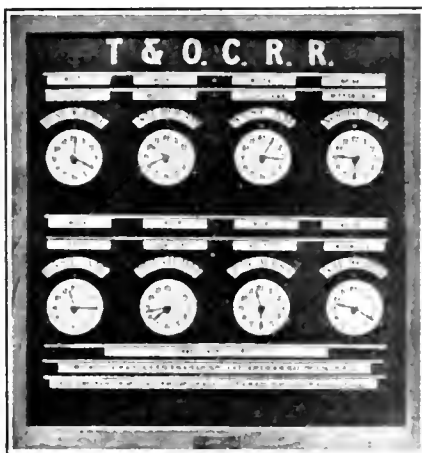
bath of oil. From this housing the drive mechanism can be removed in a few moments, and bench adjustments made or a new unit inserted.

The two sets of brakes, of the expanding type, are placed side by side, in 21-in. brake drums. Brake camshafts are in the same horizontal plane as the axle drive shafts. This is said to be a particular advantage for bus service, since the camshafts do not interfere with the frame.

The brakes are actuated by a floating cam. This insures equal pressure of the cam against both shoes and compensates for unequal wear of brake lining. The clearance between the shoes and brake drum can be equalized readily by means of the equalizing screw shown in cross-section BB. This is accomplished as follows: Apply the brakes, loosen equalizer screw, then tighten screw. While screw is loose, the equalizer bar connecting the two brake return springs can move up or down, thus allowing the tension in springs to equalize. Tightening the screw anchors bar to brake spider again.

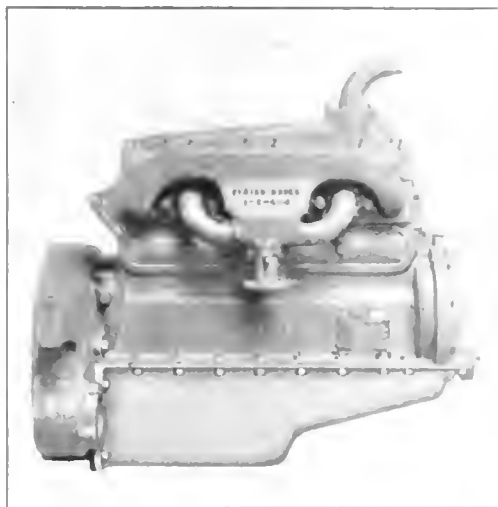
### Announcing Departures

**A** NEW TYPE of board for announcing the departure of buses or trains is being introduced by the Leu Perpetual Time Table Advertising Company, Chicago, Ill. It con-

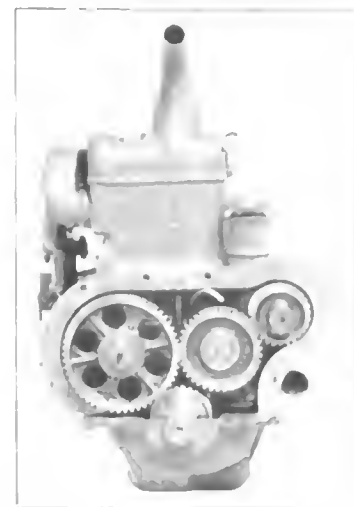


Board for announcements in bus terminals

sists of a series of clock dials mounted on a base in a frame and covered with a glass door. The individual clock dials serve to indicate the time of departure or arrival of vehicles from a given point or destination. This type of board is intended to replace the blackboard and chalk system used for indicating arrivals and departures.



Model O engine, 4 x 5-in. bore and stroke, made by Hercules Motor Manufacturing Company



### Accessories in Tandem on This Engine

**R**ECOMMENDED for buses up to twenty-nine-passenger capacity is the Model O engine built by the Hercules Motor Manufacturing Company, Canton, Ohio. This unit is of the L-head four-cylinder type, with 4-in. bore and 5-in. stroke. Complete it weighs 590 lb. and gives 45 hp. maximum at 2,000 r.p.m. Cylinder heads are removable and the crankcase and cylinder block are cast in one piece. The job is completed by an oil pan of pressed steel.

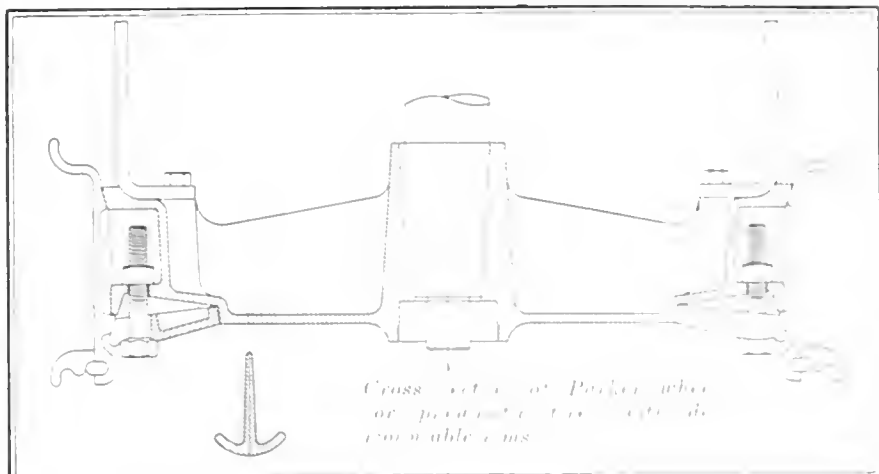
The manifold is of the hot-spot type, with exhaust and intake parts cast in one piece. The crankshaft, which is supported by three main bearings, is lubricated by the pressure system. Cooling may be either by pump or thermo-siphon. While the standard construction includes either a generator and distributor for battery ignition or a high-tension magneto without generator, by a slight change in the pump as-

sembly a generator and magneto can be installed, as is often required in bus service. With this special construction the drive to the water pump is shortened, so that generator and magneto can be driven in tandem through couplings from the pump shaft.

Suspension is of the three-point type with a trunnion in front. It is said that the engine is unusually free from vibration because all reciprocating and revolving parts are tested for both static and dynamic balance on an Akimoff machine.

### Cast-Steel Wheel with Demountable Rim

**T**HE Parker Wheel Company, Cleveland, Ohio, has produced a cast-steel wheel in which a standard demountable rim is mounted directly upon the spoke ends. The structure, as shown in the drawing, consists of a hub with T-section spokes cast integral. On the back of these spokes



are bosses to which the brake drum is attached. The rim itself is gripped by a clamping toggle on the end of each spoke. This exerts great pressure, it is said, when the bolts are tightened only with moderate force.

An additional advantage is that it can be used for "doughnut" tires, taking 20-in. rims. Existing hub and brake construction can be applied, even though the brake drum is hardly larger than the rim.

### Register Type of Bus Heater

**T**HE MODEL C Linendoll heater, which is made by the Norwalk Auto Parts Company, Norwalk, Ohio, is shown in the accompanying drawing. It is designed for the limousine type of bus body, where the floor can be cut open and a register mounted flush in the floor with the heating element underneath.

A heater pan is attached to the floor, and inside this is a heating coil made of a casting selected for its radiating qualities. The connection to the exhaust system is by a flexible steel tube, of the interlocked asbestos-packed type. This tube leads to a valve which is attached to an opening cut in the engine exhaust pipe. The valve control is by a plunger button mounted on the instrument board. This button and the valve are connected by a steel wire inclosed in a reinforced tube, so that the valve is controlled just the same as the shutter on a camera. A push or a pull regulates the supply of hot gases to the heating coils.

The heater can be taken apart for cleaning by removing three screws, one holding the cover plate and two that hold the heating unit in posi-



*Ultimate twenty-five-passenger bus with Remmele & Maier body*

tion. After the cover plate is removed, any dirt or other foreign matter can be swept out through the center of the pan. The bottom of this pan has drain grooves so that water from melting snow can run off.

Because of the design the heater can be installed in either a crosswise or lengthwise position. The maker states that one of the Model C heaters will heat a fifteen-passenger bus satisfactorily, and two are sufficient for larger buses. When two are installed they are usually placed along the center line of the body, and connected so the gases pass first through one and then the other.

### Sedan-Type Bus Carries Twenty-five Passengers

**T**HE vehicle represented in the accompanying illustration consists of a model AJL chassis built by the Vreeland Motor Company, Inc., Newark, N. J., and a Remmele & Maier body. The chassis has a 174-in. wheelbase, carrying twenty-five passengers. The front seat takes two passengers and gives the driver his

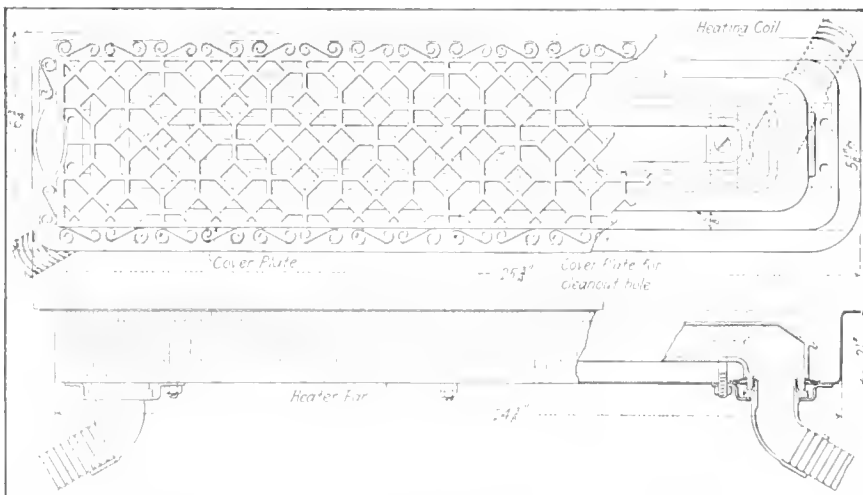


*Smoking compartment at rear of Ultimate bus*

proper position at the left, thus losing a seat.

A feature of the chassis is the Buda model EBV bus engine, which has a counter-balanced crankshaft. The chassis is similar to the regular Ultimate bus model built for speed, and has  $6\frac{1}{2}$  to 1 rear-axle gear ratio. Dual pneumatic tires are mounted on Dayton steel wheels. This wheel, which was described in the September, 1922, issue of BUS TRANSPORTATION, is of the spoke type so that the air valves of both dual tires are available from the outside. Tires are mounted on Firestone demountable rims the same as in passenger car construction, the rear tire coming off the outside wheel. Another advantage claimed is that the air valves are so easily reached that the pressure of both tires can be kept even.

Passengers enter the body through five doors on the right-hand side. The front four of these lead to straight-through seats and provide comfortably for sixteen passengers, although on a pinch five small people could use



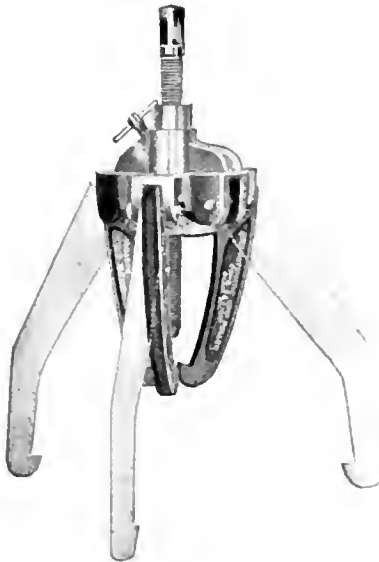
*Flush type bus heater, showing attachments for heater pan and heating unit*

them. Back of these seats is a partition which forms a rear smoking compartment, accommodating eleven passengers.

The length of the body over all is 17 ft. 6 in., and the height from the ground to the top of the roof is 7 ft. 7 in. Headroom from floor to ceiling is 56 in., this following limousine practice, since it is not expected that the passengers will stand erect or that they will be taken on and let off at short intervals.

### Combination Two-Way and Three-Way Puller

THE Greb Company, Inc., Boston, Mass., includes in its line of service station equipment a combination puller, which has a set of short jaws for close work, such as taking off rear wheels, and long jaws, which



*Greb puller for heavy duty service*

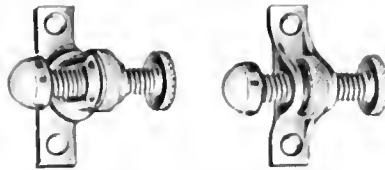
are adjustable, for other purposes. While three jaws are shown in the illustration, an extra yoke is provided so that by taking off one of the long arms it can be transformed into a two-way puller.

On all Greb pullers, the frames and center bodies are malleable iron, the jaws are drop forged steel, and the screw has a United States standard thread and is case hardened. A variety of weights and sizes are made for all kinds of work.

### Lock-Type Anti-Rattlers

THE Autoquip Manufacturing Company, Inc., Rochester, N. Y., is supplying anti-rattlers that can be locked so as to hold the window in position, in several different designs. Two of these, Nos. 501 and 506, are

illustrated. The latter is of the swivel type, so that the screw can be used either parallel to or at right angles to the base. Material for



*Types of anti-rattlers with locking feature. On left, swivel type construction*

these anti-rattlers is brass, heavily nickel-plated. The screws can be supplied in lengths from 1 to 1½-in., for any style base.

### Electric Hoist for Mono-rail Support

A ONE-MAN electric hoist, called the Lift-About, is made in 1,000- and 2,000-lb. capacities by the Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.

This device has the Shepard balanced drive and oil-bath lubrication for gears and running parts. Mechanical and electrical operating mechanism is inclosed in metal housings. The Zobell electric motor is designed for hoisting service and can be furnished for either alternating or direct current.

One of these hoists, mounted on an overhead rail, is shown lifting

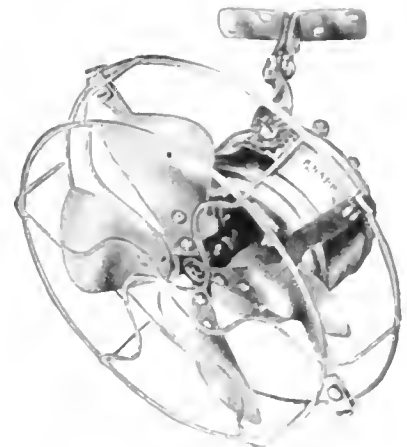


*Shepard Lift-About electric hoist placing rear wheel on tire press*

a rear wheel onto a tire press in a large bus maintenance shop. In such work the hoist would be useful, of course, for handling rear axles or other heavy parts, for which the tire press might be applied in assembling or disassembling.

### Let the Cooling Breezes Blow

INTENDED to drive out fumes and create added comfort in closed vehicles are the "Limo Sedan" fans made by Knapp Electric & Novelty Company, New York, N. Y. As shown here, the fan is furnished complete with brackets for attaching in the body, and also with a wire guard. A fan of this sort is claimed by the manufacturers to be practically a hot weather necessity, since it keeps the cool air passing through the vehicle, and is especially useful for this purpose during stormy weather when all the windows must be closed. Two sizes are furnished, with blades 6 in. and 8 in. in diam-



*Knapp electric fan adapted for bus service*

eter. The blades are finished in nickel, while the guard and motor are black japan. Either 6-volt or 12-volt windings can be supplied. The connecting cord furnished with the fan is 6 ft. long.

Current rating is 2 amp. for either the 6-volt or 12-volt winding. The 6-in. fan weighs 2 lb. ready for installation, while the shipping weight is 3 lb. The 8-in. fan is somewhat heavier (7 lb. shipping weight), since it has a metal base as well as wire guard included with the 6-in. type. Otherwise the construction of the two sizes is much the same, the larger (8 in.) being recommended for applications where it is necessary to displace a considerable volume of air.

# Condensed Specifications of Motor Vehicles for Bus Service

Revised to June 1, 1923

Trade Name and Model	Capacity, Tons	Unloaded Weights, Lbs.		Main Dimensions				Engine Details										Electrical Equipment			Transmission		Axles		Wheels		Tires					
		Chassis	Tons	Wheelbase	Cure, Front	Range, Rear	Floor Height	Steering Ctr. Hgt. Bm.	Normal Speed, M.P.H.	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Battery	Battery, Amp. Htr.	Starter	Generator	Clutch	Gearset	Front	Rear	Final Drive	Steering Gear		Springs	Brakes	Maker	Type	Type
Light Duty	14	3,050	4,250	129	36	33	28	7	Cont	3x5	V Ryd	T	Ovn FC	Eise-M	Wld	6V69	Wes	Rem	Bsh	BgBk DP	Cotta-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5	Rear	
	18	2,800	4,000	129	36	32	20	6	Ovn-6	3x4	V Stm	P	Ovn C	KW-M	Wld	6V80	Wes	Rem	Bsh	Ovn DP	Ovn-3	Tim	Torb D	W	Ross	Rt	Rimel	P	35x5	35x5		
	15	2,840	4,200	125	36	36	25	6	Cont	3x5	V Znth	P	Long FT	Eise-M	Wld	6V90	Wes	Rem	Bsh	Ovn C	Ovn-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
	10	2,900	4,200	127	36	36	27	40	3x5	Cont	3x5	V Znth	CP	Long FT	Eise-M	Wld	12V52	Wes	Rem	Bsh	BgBk DP	Dodge-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5	
	17	2,540	4,200	140	36	36	25	30	1	Cont	3x5	V Stm	CP	Long FT	Eise-M	Wld	6V80	Wes	Rem	Bsh	BgBk DP	Dodge-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5	
Medium Duty	12	2,950	3,850	124	36	36	24	35	Cont	3x5	V Znth	CP	Long FT	Eise-M	Wld	6V80	Wes	Rem	Bsh	BgBk DP	Ovn-2	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
	14	3,300	5,300	132	55	55	26	6	Ovn	3x4	G Ovn	PT	Ovn FT	Eise-M	Wld	6V80	Wes	Rem	Bsh	BgBk DP	Ovn-2	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
	12	1,430	3,850	124	36	36	22	6	Ovn	3x4	G Ovn	PT	Ovn FT	Eise-M	Wld	6V80	Wes	Rem	Bsh	BgBk DP	Ovn-2	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
	14	3,300	5,300	132	55	55	26	6	Ovn	3x4	G Ovn	PT	Ovn FT	Eise-M	Wld	6V80	Wes	Rem	Bsh	BgBk DP	Ovn-2	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
	15	3,200	3,510	132	56	56	35	7	Wauk	3x5	G Stm	CP	Long FT	Eise-M	Wld	6V132	Wes	Rem	Bsh	BgBk DP	Ovn-2	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
Heavy Duty	14	2,760	3,510	124	36	36	24	7	Lyeng	3x5	V Ensn	CP	Long FT	Eise-M	Wld	6V100	Wes	Rem	Bsh	BgBk DP	Muce-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		
	15	3,350	4,700	155	56	56	30	10	Cont	3x4	V Znth	CP	Fdrs H	Eise-M	Wld	6V120	Wes	Rem	Bsh	BgBk DP	BrLp-3	Sal	Sal 1-F	W	Ross	Rt	Rimel	P	35x5	35x5		
	16	4,950	4,300	131	56	56	40	10	Hrels	4x5	G Jnsh	CP	Fdrs H	Eise-M	Wld	6V120	Wes	Rem	Bsh	BgBk DP	BrLp-3	Sal	Sal 1-F	W	Ross	Rt	Rimel	P	35x5	35x5		
	16	4,000	6,000	180	56	56	22	67	3x5	Hrels	4x5	V Znth	CP	Ovn C	Eise-M	Wld	6V100	Wes	Rem	Bsh	BgBk DP	BrLp-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5	
	14	3,400	4,000	130	56	56	30	8	Ovn	3x5	V Znth	CP	Ovn C	Eise-M	Wld	6V90	Wes	Rem	Bsh	BgBk DP	BrLp-3	Tim	Tim SF	W	Ross	Rt	Rimel	P	35x5	35x5		





# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transportation  
industry.

## Traffic Solons Stress Safety

At Annual Meeting National Highway Traffic Association Discusses Relief of Traffic Congestion and Suggests Federal Regulation of Motor Transport  
—Place of Highways in National Transportation Explained

**S**AFETY came first, and other subjects trailed along, at the annual meeting of the National Highway Traffic Association, held on May 10 in New York City. Making the highway safe for the vehicle seemed to take first place in the proceedings. This was evidenced by the hearty approval given the railways' campaign to lessen accidents at grade crossings. Also by the favorable reception of reports advocating such matters as traffic separating lines to serve as positive visible gages on curves and straightaways; standardization of traffic devices in the cities, and of danger signals on rural highways; and the proper construction of curves, as regards banking and guard-railing, to lessen accidents.

The other phase of the problem, making the vehicle and its operator safe for the highway, also received due attention. Better drivers, better braking, and more conservative loading of motor trucks were favored, and

methods proposed to get them. A new caution plate recently adopted by the National Automobile Chamber of Commerce was described by David C. Fenner, International Motor Company, New York. This plate, which will be filled in by the chassis maker, shows the chassis weight and the total weight of body, equipment and load that the chassis should carry. It has two purposes: to prevent overselling and to discourage over-rating, particularly in license applications.

Common carrier control of motor vehicles is growing steadily, according to a report presented for the association committee on motor vehicle franchises. This summarized the law-making efforts of state legislatures during the current year, giving information that has already appeared in **BUS TRANSPORTATION**.

Progressive traffic control, rather than the synchronous method now used in most of our large American cities,

was strongly urged in a report presented by Prof. Louis W. McIntyre of the University of Pittsburgh. On main thoroughfares the traffic lights would be changed progressively along their length, and the traffic would move in platoons. A vehicle having joined a given platoon would remain there throughout its journey on the main thoroughfare, and the platoon would make the complete trip without stopping, except in case of emergency. Crosstown traffic would pass between platoons, which would be spaced according to traffic conditions.

### OPERATE CAUTIOUSLY OVER CROSSINGS

H. A. Rowe of the Delaware, Lackawanna & Western Railroad, in presenting a report on safety regulations at grade crossings, said that in 1922 1,810 persons were killed and 5,383 injured at such crossings. The American Railway Association, he announced, will renew this year its crossing safety campaign, using newspapers, motion pictures, road bulletins, pictures on windshields, and other methods to drive home its "Cross Crossings Cautiously" slogan.

Mr. Rowe made the following suggestions of interest to operators:

1. Licensing officers should exercise increasing care in granting licenses only to those physically and mentally qualified. Minimum eye and ear standards should be established. A certificate of a reputable ophthalmologist and aurist should accompany application for license.

2. It should be illegal to drive a car over a railroad track at a higher rate of speed than 10 m.p.h., and there



*Descriptive poster by means of which the Long Island Railroad preaches safety*



should be established a sufficient police force in every community to make this rule effective.

3. All automobiles carrying freight or passengers for hire should come to a full stop between 25 and 75 ft. from railroad crossings, not to proceed until the way is shown to be clear. This can be made effective by rewards upon conviction.

#### INTERSTATE REGULATION FAVORED

Highway transport clearing houses were discussed in a report prepared by Tom Synder, secretary National Association of Commercial Haulers, Indianapolis. These clearing houses are needed to centralize the demand and supply for short-haul freight carried by motor transport, and the report recommended that the association confer with the Interstate Commerce Commission, with a view to the early development of interstate motor transport regulation. Action by the Interstate Commerce Commission would tend greatly to stabilize state regulation, in the enactment of which, especially as to rates, schedules and fixed routes, great obstructive errors have been and will continue to be made, according to the report.

The concluding feature was a report on the function of streets and highways in our national transportation, presented by J. Rowland Bibbins, consulting transportation engineer, Washington, D. C. To take care of the steady growth of transportation demands and the limited capital supply, Mr. Bibbins recommended that highway transport should be regarded as a complete business, including both roadway and vehicles, and it should carry its own burdens on the "pay-as-you-use" plan.

Rail systems, he thought, both steam and electric, should have the prior right of and be encouraged in adopting motor transport where economically justifiable, to avoid needless dissipation of investment and insure lowest combined transport costs.

The use and support of public streets and highways have now become an essential part of a whole transport plan. The public, therefore, must now determine whether its own best interests lie in competition or co-ordination; taxation or subsidy; whether such use is in public or private interest. Discrimination will likely ensue unless the policy is broadly conceived.

#### Simplification Committee Plans Future Activities

THE Automotive Simplified Practice Committee met on May 15 at the office of the Motor and Accessory Manufacturers' Association, New York. Seven of the thirteen associations included in its membership were represented. M. L. Heminway, chairman of the committee, presided. R. S. Burnett, standards manager of the Society of Automotive Engineers, was elected permanent secretary of the committee. G. R. Lundane, representing the Auto-

### Meetings, Conventions and Exhibits

June 19-20 Society of Automotive Engineers, Summer Meeting, Spring Lake, N. J.  
June 26-27 Automobile Body Builders' Association, Detroit, Mich.  
July 2-20 Automotive Engineers' Association, Knoxville, Tenn.  
June 29-July 30 Annual meeting of Society of Testing Materials, Chattanooga, Tenn.  
July 1-11 Washington Auto Transportation Association, Tacoma, Wash.  
July 14-15 Idaho Automotive Trade Association, Twin Falls, Idaho.  
July 23-24 National Automobile Dealers' Association, Hotel Grand, Chicago, Ill.  
July 25 Semi-annual meeting of the Alabama Automotive Trades Association, Mobile, Ala.  
Oct. 1-3 National Safety Council Exhibit, Buffalo, N. Y.  
Oct. 2-26 Society of Automotive Engineers (Production), Cleveland, Ohio.  
Dec. 10 Philadelphia Motor Truck Association, Philadelphia, Pa.

otive Equipment Association, was elected a member of the executive committee.

A report from the battery committee (see page 252, May issue BUS TRANSPORTATION) was presented by A. D. T. Libby of the Automotive Electrical Association. The result of a study of questionnaires sent out by the Na-

tional Automobile Chamber of Commerce (which, according to Mr. Libby, that about 85 per cent of all cars made in the United States are using four interchanged sizes of battery).

After discussing various phases of battery standardization, it was decided that car manufacturers should easily standardize one or two lengths of compartment. The committee will work out a compartment standard, standardized by the Society of Automotive Engineers. It was also recommended to request the S. A. E. standard committee to give early consideration to this matter.

A report also that the E. C. F. class soon recommended the standard for spark plugs, brake lining and piston rings and grooves in the next year for future work, in carrying out the committee's purpose of standardizing the size of existing standard. Other suggested were radiator caps, gasoline tank caps and steel tire nuts, which are affecting weight. It was finally decided to start with radiator and tank caps. E. V. Hernecke of the National Hardware Association and A. C. Ames of the American Automobile Association were appointed a committee to report on the present cap standards at the next meeting, which will be held on June 14 in New York.

## Transportation in All Its Phases

Plans Made for Railroad Rescue Work by the United States Chamber of Commerce—State Regulation for Utilities Is Favored as Against Control by Local Authorities

AT THE eleventh annual meeting of the Chamber of Commerce of the United States, held May 8-11 at New York, the view of the Chamber on the transportation problem was summed up in a resolution adopted at the closing session, which described the activities of the Transportation Conference formed recently under the auspices of the Chamber. The task of this conference, which is a huge committee representing various interests, is to prepare a "forward-looking program for the systematic development and co-ordination of all forms of transportation facilities, whether by rail, water or highway." Among the objects which it is hoped to accomplish is the insuring of a constant and uninterrupted flow of commerce in the public interest, the making of rate adjustments on a scientific basis equally just to the shippers, the carriers and the ultimate consumers, and thus enable the carriers to provide necessary additional facilities, earn a fair return on their investments, and at the same time reasonably compensate all loyal and efficient employees.

At the opening session Herbert Hoover, Secretary of Commerce of the United States, stressed the need for confidence, and courage as well, if we are to hold on to our present prosperity. The preservation of initiative and the safeguarding of the rewards of individual effort, character and ability,

are keystones, the Secretary said, which must be preserved, "for when all is said and done the finest flowers of civilization do not grow from the cellars of poverty any more than they grow from the palaces of extravagance. They grow from the bettering comforts and well-being of the whole of great peoples."

The shortage of transportation, to the Secretary's mind, is one of the great wastes in our economic machines. It is the most profound and far-reaching deterrent upon our growth. It imposes great costs upon production. The cause of this shortage, he believes, is the continued strangulation of railroad finances experienced before the enactment of the present (1920) transportation law. While the ultimate solution of the transportation problem depends upon further study by government and private organizations, Secretary Hoover recommends that all the local chambers of commerce and business organizations definitely organize to co-operate with every local railway official as an aid in handling the vast volume of commodities now being produced and consumed.

The motor vehicle work of the Transportation Conference was reported on by its chairman, A. H. Swayne, vice-president General Motors Corporation. Mr. Swayne's report told of how his committee is studying the relation of

the highway and motor transport to other transportation agencies. So far three sub-committees have been formed, these taking up the use of the highways by motor vehicles, motor service in connection with railroad freight terminals, and the legal aspect of highway transport in its relation to other carriers. In addition a special report is under way covering the use of gasoline equipment by rail lines.

In the electric railways and motors field, the report indicated, some examples of recent operation indicate that there is a place for supplemental use of the motor bus by electric railways, and that some method of co-ordination is possible which will eliminate unnecessary competitive charges to the public, while still preserving the flexibility of service, in which the public is most interested.

At one of the general sessions the development of a national system of rail, water and highway transport was considered. The Hon. C. A. Newton, member of the U. S. House of Representatives from Missouri, spoke in favor of the improvement of our inland rivers, so as to make them available for navigation. He also favored legislation that would guarantee to the investor of river equipment freedom from ruinous and confiscatory competition. Charles H. Markham, president Illinois Central Railroad, said that as competitors the waterways and highways have an unfair advantage over the railroads. It is inimical to the public welfare to develop motor vehicle transportation upon a subsidized basis at the expense of the patrons of the unsubsidized railroads. Where commercial conditions are favorable to the use of motor trucks transporting goods for short distances Mr. Markham favored the construction of short stretches of hard-surface roads designed and designated primarily for the use of motor trucks. Elsewhere, he said, the railroads are not opposed to the building of good roads, provided motor vehicles operated thereon for commercial purposes pay a fair share of the cost.

Speaking for the motor vehicle, Roy D. Chapin, chairman of the board, Hudson Motor Car Company, Detroit, Mich., said that the motor car meets a universal need, and that its far-reaching influence must be understood before attempting to analyze highway transport in relation to other agencies of transportation. Actual competition between rail and motor carriers today is negligible as regards the transportation of freight, and where it does exist this competition is largely due to the fact that the rail lines, suffering from undue regulation, and cramped beyond reason financially, have been unable to provide desired facilities. The motor vehicle operator does not want and does not believe in the long haul of freight, save under exceptional conditions which usually have been forced upon him. In the case of passenger travel, perhaps the steam lines would do well to consider long haul bus operation, partic-

ularly in scenic country, as a supplement to their rail facilities.

After referring to the fact that traction operators are now going into the bus field, Mr. Chapin suggested that London and Paris might have something to teach us in the handling of mass transportation on the main thoroughfares of cities. In any city the present public utility operating mass passenger transportation should be ever ready to give the public the particular type of service it wants, even though it may call for supplementing its equipment with a new medium. Care must be taken, of course, to pro-

tect the public against the evils of either unwise monopoly or too drastic regulation.

In the opinion of the Chamber, as expressed in one of the resolutions presented during the final session, the principle of regulation through a body created by the state has been recognized throughout the country as best calculated to result in decisions equitable alike to the utilities and their patrons. To delegate such authority to local authorities would represent retrogression, and its consequences would be detrimental to the best interests of the public.

## Auto Bus Association of New York State Meets in Syracuse

ON May 17, at the Onondaga Hotel, Syracuse, the Auto Bus Association of the State of New York held its second quarterly meeting of the year. Vice-president F. D. Carpenter, Watertown, N. Y., presided. At the morning session, Secretary J. J. Dadd reviewed the accomplishments of the four previous meetings, mention of which has already been made in earlier issues of BUS TRANSPORTATION. He also reviewed the association's activities during the recent session of the State Legislature. He stated that this was the first year that any one representing the motor bus industry of the state had appeared at committee hearings on bills affecting the industry. Much favorable comment was evident when the committees learned that the association represented forty-five individual companies or owners of buses with a capital investment of nearly \$6,000,000 in transportation facilities.

Watertown, he stated, now has the largest number of members in the association, and all lines coming into that city, with one exception, have allied themselves with the association. The strongest appeal that the association ever had for membership is now available, and that is the arrangement that has just been completed with the Merchants Mutual Insurance Company of Buffalo to write liability insurance for the members, provided they will conduct their business along sound lines.

The treasurer's report for the period Dec. 28, 1921, to May 16, 1923, showed the receipts had been \$1,050.50, and the expenses for the same period had amounted to \$1,075.65, leaving a cash deficit of \$25.15. There is outstanding however, nearly \$750 for dues payable from members.

E. B. Burritt, manager National Motor Transport Association, New York, led an informal discussion on the necessity of bus owners having some systematic method of collecting fares. He spoke of the laxity that had come to his attention, and urged that if the industry is to go forward bus owners should use carefully devised

systems that will enable a closer check to be made on fare collections. The discussion brought out a considerable difference of opinion. One operator thought that if he installed such a system it would react against him, because the patrons of his buses would think he did not trust them to pay their fares.

Others who spoke argued that the bus man must establish himself in the eyes of his patrons as conducting his affairs on a regular business basis, otherwise they would not believe that he was right if he ever had to ask for increased rates.

C. W. Stocks, BUS TRANSPORTATION, described the fare receipts used by the Capital Bus Lines of Ottawa, Canada. Mr. Burritt also spoke of the MacDonald system of fare collection and told of its successful use on the Delaware Rapid Transit line running out of Wilmington. He also mentioned the Ohmer register, the International counting register and the Johnson registering fare box, all of which have a particular place in fare collection systems.

At the afternoon session Secretary Dadd spoke on the benefits of membership in the association and urged non-members in attendance to enroll. J. R. Young, Merchants Mutual Liability Insurance Company, Buffalo, said very often the results from association membership were largely of indirect benefit, and it was difficult to say in dollars and cents just how much each member gained.

R. N. Falge, engineering department National Lamp Works, Nela Park, Cleveland, Ohio, gave an illustrated talk on interior illumination of motor buses. He told of the tests that had been conducted by his laboratory and said an experimental job had recently been installed on one of the Cleveland-Akron buses where its operation could be closely watched. This installation has very materially improved the quality and quantity of light. This was due in part to the fact that in wiring the lamps a three-wire scheme was used instead of the simple two-

wire line. This eliminated the drop in voltage on the end lamp and materially increased the amount of illumination.

The use of standard 2, 4 and 21-cp. lamps was urged wherever possible, as it simplified the renewal problem. Two candlepower lamps are recommended for use on dash and fare box. For use in tail lights, on steps, as side marker lamps and for running lights, the 1-cp. lamps are suggested. In all other places, as interior lights, headlamps, spot light, signals, the 21-cp. lamps should be used. Such a layout simplifies the renewal problem by decreasing the number of types of lamps used.

Mr. Fudge also told how headlights should be adjusted so as to avoid glare, thereby insuring more safety in night operation.

#### LIABILITY INSURANCE

J. R. Young, president Merchants Mutual Insurance Company, Buffalo, explained the plan just worked out with the association to carry liability insurance for its members. This plan covers a two-year arrangement, which can be canceled at the end of the period on a prorated basis, after which the association may start its own company, if it so elects. Otherwise a separate company will be formed to carry the bus insurance.

The plan was worked out on the basis of writing liability insurance for at least 100 buses annually, at rates which will be from 12½ to 15 per cent less than those charged by stock companies for similar protection. Strict accounts will be kept of all losses paid, so that

instead of receiving dividends at the end of the year policyholders can secure their insurance at decreased rates as soon as it is evident that the present rates are more than sufficient to meet all payments accruing under the policies written.

As a safeguard the insurance company will have its regular staff of representatives, now numbering 300 and scattered all over the state, supplemented by inspectors whose duty it will be to report on conditions of operation as observed. Special attention will be paid to speed of the buses, their condition, the roads, grades, etc., all with a view to determining the character of risk.

The insurance company also demands that the bus owners have some regular system of inspecting their buses and that they be kept in safe operating condition. Of especial interest to the bus owner is the plan to make yearly allowances for all days that buses are not actually in service. Under the terms of the policy the bus owner must keep a record of the buses in service by days. These records are in turn sent regularly to the insurance company and adjustments made in premiums paid every twelve months.

In pointing out the safety of the mutual insurance plan, Mr. Young said that as an added protection to the policyholders the insurance company had secured reinsurance of its assets, to prevent assessments. Not since the company has been in business has more than 50 per cent of the premiums been used to pay losses.

highway to be tested on the concrete boulevard at Spring Lake. The subjects of over-size or balloon tires and road illumination will also be taken up in papers and by demonstrations.

Rules governing the conduct of buses and trucks are set out in detail with regard to the conduct of passengers, who must act as drivers, and the conduct of drivers in service, who must not exceed 25 m. p. h. A table of requirements to be followed by bus owners in case of accident is also attached, indicating what should be reported to the report to the insurance company.

Officers of the association were besieged with agents of insurance companies as soon as the law was passed in view of its provision requiring the taking out of liability insurance and the giving of bond covering injury or death to passengers and property. It was because of this largely that the association decided upon a system of self insurance, and this is now being worked out in detail. An insurance company, composed of practical businessmen, is being formed and will be incorporated in the near future. Trustees are to be named representing the Ohio Motor Bus Owners' Association and the Ohio Motor Haulers' Association, and will be announced soon.

The rates of taxation under the regulatory bill passed by the Legislature recently are reviewed elsewhere in this issue.

#### Engineers to Meet at New Jersey Resort

THE summer meeting of the Society of Automotive Engineers, to be held June 19-23 at Spring Lake, N. J., will be featured by demonstrations supplementing the usual technical papers. One entire session will be devoted to four-wheel brakes, and different types will be tested on the concrete boulevard at Spring Lake. The subjects of over-size or balloon tires and road illumination will also be taken up in papers and by demonstrations.

Members of the Bureau of Standards staff will present the results of tests made to determine the increasing seriousness of the dilution problem as gasoline volatility is lowered. Another group of papers will discuss the effect of dilution on the lubricating qualities of crankcase oil.

#### Body Builders to Hold Forth in Detroit

THE Automobile Body Builders' Association will hold a convention on Tuesday, June 26, and Wednesday, June 27, at the Hotel Statler, Detroit. The main theme of the convention, it is announced, will be "Conservation," with special reference to efficient labor, high wages, shop methods, shop management, and close competition. All car makers, body builders, body material and parts makers, or distributors and others interested in the automobile industry are invited to attend the opening session at 10 a. m. on June 26.

## Ohio Motor Bus Men Forming Their Own Insurance Company

OHIO motor bus men are forming their own insurance company and will save commissions and fees which liability insurance companies would charge were they to handle the policies on motor buses and trucks which the new Ohio bus regulation law requires.

This is one of the interesting developments in the still youthful career of the motor bus in Ohio and of the Ohio Motor Bus Owners' Association in particular, which has now a membership of 200 companies. With the enactment of the Freeman-Collister bill by the Legislature the bus and truck business found itself on a stable and well regulated basis for the first time. The association is vastly pleased with the new law, with the tax rates applied to the industry and the regulatory phases provided under the state utilities commission. It spells the elimination of so-called "wildcat" bus and truck operation and places the industry on a par, so to speak, with the traction and other transportation media which are regulated by the commission.

At a meeting of the organization on April 30 the new law was explained in detail by attorneys and officers of the company. A committee was named to

draft regulations, these to be submitted to the State Utilities Commission for approval and promulgation among bus and truck men as the official rules governing their activities.

The committee was composed of B. F. Mackey of the Ultimate Bus Company, Martins Ferry; E. M. George of the Cadillac Bus Company, Chagrin Falls; S. M. Vashbinder of Newton Falls; R. W. Sanborn of the Cleveland-Akron Bus Company, Cleveland; Ray Maag of the Maag Bros. Transportation Company, Marion; John Fraak of the Liberty Auto Company, Zanesville; I. B. Baker of the Red Star Transportation Line, Cambridge, and A. J. Halloran, Springfield.

The tentative draft of the regulations is now complete and is to be submitted to the commission as soon as the committee reports back to the association at a meeting to be held within a few days. They set forth the requirements under the law, such as application for certificates of public convenience and necessity, with a form of application, in which must be shown the physical property of the applicant, the complete route to be covered and the schedules and tariffs, a sketch map showing the



# News of the Road

From wherever the bus runs, are brought together the important events, here presented to show the movements of the day.



## 100 Buses for Los Angeles

**Under Program Provided for at May Election Los Angeles Will Have Buses and Railway — Equipment Already Ordered**

A PUBLIC election in Los Angeles, Calif., on May 1 resulted in the defeat of two proposals for the operation of buses in competition with the street railways. Following the election the plans for extensive improvement of Los Angeles transportation facilities were officially approved on May 7 by the Los Angeles Board of Public Utilities, by granting permits for the operation of buses in connection with the electric cars.

Shortly after the election the Pacific Electric Railway and the Los Angeles Railway formed the Los Angeles Motor-bus Company to operate motor bus "feeder" lines in the city as part of the new plan. As soon as this detail had been arranged the two railways ordered \$750,000 of the most improved type of motor buses. The order for the new buses was placed on May 26 with the Moreland Motor Truck Company, Los Angeles.

The bus system of the new company will be operated in close harmony with the two railways as supplementary parts of their transportation system. The two railways have a mileage of more than 1,500. The buses will cover routes totaling approximately 70 miles.

The \$750,000 order calls for two styles of the latest types of motor buses manufactured by the Moreland concern, both single and double deck. They are of the low gravity type, with underslung worm drive and drop frames, engineered to eliminate possibilities of overturning, to provide ease of handling and the least obstruction to other traffic in the streets, speed and the highest degree of safety and comfort to passengers. The single-deck buses will seat twenty-six and the double-deck ones fifty-six passengers.

At the election on May 1 local and Eastern capitalists submitted a proposition to compel the City Council to advertise bids for a bus franchise. This was defeated. The second proposal was to repeal the jitney bus ordinance adopted in 1917 barring buses from the downtown district bounded by First, Eighth, Los Angeles and Olive Streets. This measure was also defeated.

The service improvement program includes construction of new track extensions by the Los Angeles Railway, the operation of buses by the Los Angeles Railway, the operation of joint buses by the Pacific Electric and the

Los Angeles Railway under the name of the Los Angeles Motor Bus Company.

The People's Motor Bus Company, conceding defeat, filed an application with the local Board of Public Utilities immediately after the election withdrawing all its propositions for motor bus lines in Los Angeles over some nineteen routes paralleling all railway lines and reaching practically every section of the city. The withdrawal, however, is given as temporary. The Hellman-McAdoo interests, back of the People's company, state there is no necessity of their company entering the field again now, as railway companies have promised Los Angeles adequate bus lines and improved railway service to relieve the present transportation congestion.

### DEFEATED INTERESTS WITHDRAW APPLICATION

William G. McAdoo of the People's Motor Bus Company made the following statement:

My Eastern clients have withdrawn their application to establish a motor bus system in Los Angeles, and I think they have rendered a genuine service to the community in focusing the attention of the public on the city's imperative transportation problem. The railway monopoly under threat of competition has made various promises to meet the transportation necessities of the community. These comprehend consolidation of the two street car lines, the building of subways, the extension of railway lines and the operation of motor buses. Everybody will await with interest performance in accordance with these promises.

The longest extension proposed to be made by the railway will be on Main Street from Slauson Avenue to Manchester Street, 4 miles, serving a rapidly developing residential district.

The Los Angeles Railway bus lines, for which permits were awarded on May 7, are as follows:

Melrose Avenue, round trip 3.3 miles; Lincoln Park Avenue, 1.64 miles round trip; Wilshire Boulevard, 11 miles round trip, fare 10 cents; Thirty-seventh Place, round trip 2 miles; Beverley Boulevard, 3½ miles round trip.

The longest line to be operated by the joint bus company is from Laurel Canyon and Sunset Boulevard, Hollywood, to Eighth and Olive Streets in the downtown district. This is approximately 10½ miles. Fares will be 6 and 10 cents with transfers to other buses of the joint company and all railway lines.

Joint bus lines are proposed on Vermont Avenue. This line will have a downtown terminal at Eighth and Olive, and run to the Hollywood district via Eighth Street and North Vermont Avenue, every other bus to be routed to Los Feliz Road and east on Los Feliz Road

to Commonwealth Avenue. This route is approximately 7 miles long, and the Los Angeles Motor Bus Company proposes a 6-cent fare between Commonwealth Avenue and Wilshire and Vermont, with free transfers to the lines of the Pacific Electric Railway on Hollywood and Santa Monica Boulevards, and to the bus line on Sunset Boulevard within the Hollywood district. A 10-cent fare is proposed between Commonwealth Avenue and Ninth and Olive in the downtown district with transfers to all lines, both rail and bus, operated by the Pacific Electric Railway and the Los Angeles Railway.

The program approved on May 7 by the Board of Public Utilities will call for the operation of more than 100 buses.

The permits issued by the Board of Public Utilities are good for one year.

Several other bus lines are advocated for other parts of the city by F. A. Lorentz, chief engineer of the Board of Public Utilities, who recommended the bus routes adopted by the board on May 7.

## Buses Will Replace Brattleboro's Trolleys

W. A. Buttrick, Boston, vice-president and general manager of the Twin City Gas & Electric Company, operating the local electric railway at Brattleboro, Vt., announced on May 29 that it was proposed to abandon the electric line and substitute buses. Mr. Buttrick said that his company planned to use three buses, carrying twenty-five passengers each, over the same route now covered by the trolley cars. The fare will probably be raised from 8 to 10 cents. He expressed confidence in being able to give the public better service with buses.

## Bus Terminal Established in Dubuque

Realizing the need of adequate waiting room facilities for bus patrons, the Dubuque (Iowa) Chamber of Commerce has fitted up the lower floor of the chamber building into a rest room and comfort station. Accommodations for more than 100 patrons have been provided. Checking facilities are maintained for patrons wishing to leave parcels.

At the present time six lines are operating into the city and every line reports an excellent business. With the advent of summer bus service will be given every community within a radius of 40 miles.

June, 1923

## Service Started in St. Louis

First of More Than 100 Buses Placed in Service in Mound City on May 28—300 Buses Eventually

THE People's Motorbus Company, St. Louis, a subsidiary of the United States Bus Transit Corporation, started service on Monday evening, May 28, with nine double-deck buses of the Fifth Avenue type. Service was given between Grand and Lindell Boulevards and the Municipal Theater in Forest Park.

On the following day the line between Adelaide Avenue, University City (6700 West), and the Eads bridge, at Third Street and Washington Avenue, St. Louis, was put into service with fifteen buses. The first bus left Adelaide Avenue and Delmar Boulevard at 6 a.m., and the last departs from the Eads bridge at midnight.

Richard W. Meade, president and general manager of the company, told a representative of BUS TRANSPORTATION that the thirty-four buses have already been ordered for use in St. Louis and that they will be received at the rate of six a week or better. He expects to have more than 100 buses in use in St. Louis a year from now. Eventually the lines contemplated will use upward of 300 buses.

An instance of the need for added transportation facilities is furnished by South Grand Boulevard from Meramec Street to Carondelet Park. In many respects this is the fastest growing district in St. Louis. It is new territory for the People's Motorbus Company. In addition along Grand Boulevard are the big first-run motion picture houses of the city. It is the plan of the bus officials to have a fleet of buses on hand when the big shows close. In fact, a special line will be operated to the theaters when the full quota of buses is on hand.

The big green buses made a very natty appearance on their first trip. They are lettered in gold leaf. The crews wear olive drab uniforms with military caps. Each bus seats fifty-one persons, twenty-two inside and twenty-nine on the roof.

The buses stop on the far side of the street, so as to avoid the street cars, which stop on the near side. Mr. Meade explained that with automobiles parked along the curb it is difficult for drivers to see waiting passengers on the near side of the street. The fare charged is 10 cents, with a transfer to and from the Grand Boulevard line.

The company has had plans prepared by James C. McGuire & Company, 50 Church Street, New York, for a large two-story garage, assembly plant and general office building to be erected on property recently purchased on Grand Boulevard just north of Carondelet Park. This garage will have storage space for more than 100 double-deck buses. It will be of reinforced concrete, brick and steel. Later two additional garages will be erected, one in University City and the other downtown.

The officials of the bus line are: Richard W. Meade, president and general manager; Arthur O. E. Bush, superintendent of transportation, and Joseph Conniff, superintendent of equipment. Both Mr. Bush and Mr. Conniff were with Mr. Meade when he had charge of the Fifth Avenue bus service in New York City. Mr. Bush later went to Los Angeles. Temporary offices have been opened at 585 Adelaide Avenue, University City, while temporary garage space has been secured at 3082-86 Delmar Boulevard.

## F. A. C. Co. Holds a May Party

The annual May party given by the Fifth Avenue Coach Company for its employees was held this year on the roof of the West 132d Street garage. It was characterized by the usual success that attends all of the company's affairs. Despite the inclement weather, more than 1,000 employees, their families and their friends enjoyed an evening's entertainment of vaudeville, movies and dancing.

Parked around the edge of the roof of the garage were double-deck buses that served as box seats for those who did not care to join in the festivities that were going on in the improvised arena which the buses thus formed.

The children enjoyed taking their places at the steering wheels of the buses, making believe that they were taking their daddies' places. They romped and played to their hearts' content, chasing souvenir air balloons and filling up on ice cream while their parents and others watched the crowds dance to the syncopated music of one of the snappiest orchestras in the city.

There was a very good vaudeville program.

The May pole dance brought back fond recollections to the grown-ups and provided endless sport for the children.

These parties of the Fifth Avenue Coach Company grow from year to year in size, importance and variety. The wonder is that the committees in charge of them are able each succeeding year to find new sources of entertainment, but there appears to be no end to the originality of the officials in supplying new thrills and in dishing up old forms in a manner that makes them doubly attractive.

## Philadelphia Railway Gets Bus and Trackless Trolley Franchise

Philadelphia has just passed through a stormy siege regarding ordinances granting franchises for operation of buses and railway lines in the city. Two ordinances were recently passed by City Council granting subsidiaries of the Philadelphia Rapid Transit Company franchises for operating a motor bus line on Roosevelt Boulevard and a trackless trolley line on Oregon Avenue. They were bitterly criticised by Mayor Moore and a number of speakers at a public meeting.

When the ordinances were finally placed before the Mayor he vetoed

them, but the Council overrode the veto by a vote of thirteen to seven. The Mayor immediately made a speech accusing the Council of not adequately protecting the interests of the city. One of his principal objections was to Section 2, which provided that the rate of fare for the trolley would be "readable public service" call be 10 cents for the full distance or part thereof, with the privilege of inter-change with Philadelphia Rapid Transit Company surface line for an additional charge of 3 cents.

Representative of the Philadelphia Rapid Transit Company, the holding company for the franchises to which the franchises were granted, said that the motor bus, for which the Roosevelt Boulevard ordinance provided, would be running before the end of the year. In Oregon Avenue the trackless type of trolley car will be used, and preparations for its installation probably will proceed at once.

## Bronx to Fight Installation of Trackless Trolley

The Board of Estimate of New York at its May 11 meeting approved an appropriation of \$175,000 to cover the cost of nineteen new trolley cars for operation to the terminal of the rapid transit line at Pelham Parkway and City Island. This trolley line will run via White Plains road and Eastern Boulevard. The General Electric equipment is to consist of a number of these vehicles and the cars will have Westinghouse equipment. The vehicles are to be built by the Borsway Motor Truck Corporation of Carlisle, N. Y.

The need for public transportation facilities in the district mentioned is generally recognized but there appear to be some differences of opinion as to what is best to be done about the matter. In consequence William J. Schieffelin, chairman of the Citizens Union, has begun a taxpayer's action to restrain the city from proceeding with the expenditure of money for the construction and operation of the line. Justice John Ford of the Supreme Court signed an order for the city commissioners to show cause why a temporary injunction should not be issued, returnable before Justice Lehman.

Leonard M. Wolfson, attorney for Mr. Schieffelin, contended that the city had no power to construct or operate such a transportation line; that the running of the proposed line through a public park and parkways was a violation of law; that the certificate of convenience and necessity had been obtained from the Transit Commission, and that the proposed line violated Chapter 182 of the Laws of 1912 relating to railroads and public parks.

The main objections to the line were that the construction would mar the parkway and that the addition of trolleys would increase congestion, already very bad.

### More Buses in San Diego

The San Diego (Cal.) Electric Railway soon will start motor coach service over 17½ miles of San Diego streets, under a proposal just made public by General Manager Claus Spreckels. In connection with the proposal, the company has applied to the State Railroad Commission for permission to abandon certain of its street car lines and replace them with motor coach service.

When Claus Spreckels was chosen as general manager of the San Diego Electric Railway he declared strongly in favor of motor coach service for less populous districts, reversing the policy of his predecessor on that issue. That his faith in the motor coach as an aid in solving the railway's transportation problem has grown as a result of small scale experiments is demonstrated by the announcement of this extensive program of motor coach service.

The new service as announced involves the abandonment of approximately 8.64 miles of railway, including the line to Old Town and portions of the Point Loma lines, and the substitution therefore of motor coach routes covering a total of about 17.45 miles. Carrying out of the plan will involve the purchase of additional motor coaches, although the number required has not yet been determined. The new motor coaches will be similar in style to the Fageol buses now in use. These buses have center aisle and cross seats.

### Concourse Bus Line Resumes

The Concourse Bus Line, New York, has resumed operations after having been stopped by an injunction obtained by the Third Avenue Railway System, as described in BUS TRANSPORTATION for May, page 259.

One of the articles of the franchise provides that the weight of the bus shall not be such as to exceed 600 lb. per inch width of tire. Another provides that "No stage or omnibus shall be operated pursuant to this contract unless there shall be painted thereon in letters sufficiently large to be clearly visible for a distance of 75 ft:

1. The name of the company owning and operating such vehicle.
2. The number of the vehicle which shall be assigned to it by the company and which shall not be changed so long as such vehicle shall be operated by the company.
3. The number of adults for which the vehicle has seating space."

### Weekly Pass in Springfield, Mo.

Beginning on Monday, March 26, patrons of the railway and motor bus lines operated by the Springfield (Mo.), Traction Company could ride all week for \$1. A. E. Reynolds, vice-president and general manager of the system, said that this plan was not only possible but practical. The passes are transferable and patrons are at liberty to loan them to others.

## Tabular Presentation of Recent Bus Development

### Incorporations

Name	Address	Route
The Hall Auto Service Co.	Cleveland-Ashtabula-Conneaut Bus Co.	Cleveland-Elyria-Toledo, O.
Cleveland-Warren-Youngstown Stage Co.	Irrington-Reedsville-Warsaw Bus Line, Inc.	Cleveland (Ohio)-Conneaut
Hudson Bus Trans. Co.	499 Liberty St., Jersey City, N. J.	Cleveland-Youngstown
Southern Association Bus Lines, Inc.	Columbia, S. C.	
Excelsior Bus Corp.	137 Butler St., Paterson, N. J.	
The Central Transportation Co.	137 State St., Trenton, New Jersey	
Canton-Akron Trackless Coach Co.	Canton, Ohio	

### Lines Proposed

Name	Address	Route
Newcastle Bus Co.	Little Falls, N. Y.	Richmond and Connersville, Ind.
Virgil Hale	Grangeville, Idaho	Newcastle and Rushville, Ind.
Chas. F. Phillips	Lebanon, O.	Little Falls to Cooperstown
W. G. Peacock	Baltimore, Md.	Grangeville to Elk City
J. Blair	Birchwood, Wis.	Lebanon to Kings Mills
P. G. Schatz	Kennett Square, Pa.	Baltimore to Washington, D. C.
H. B. Sowers	Waterloo, Iowa	York, Pa., to Baltimore, Md.
Lake Region Bus Lines	York, Pa.	Birchwood to Ric Lake
B. & D. Bus Co.	Fredericksburg, Va.	West Chester to Kennett Square
Blue Bird Transportation Co.	Utica, N. Y.	Waterloo to West Union
Tri-City Railway Co.	Westport, Conn.	In Moline, Ill.
East York Improvement Association	Reading, Mass.	Ocala to Orlando, Fla.
Northern Neck Transportation Co.	Boston, Mass.	Front Royal to Fredericksburg
Utica Railways Co. Co-ordinated Bus Lines, Inc.	Greenwich, N. Y.	
I. B. Staars	Houston, Texas	Inside Utica City limits
Weburn-Reading Bus Line	Red Bank, N. J.	Compo Beach
Boston Elevated Rwy.	Carthage, Ill.	Woburn to No. Sangers
Paul Aiken	Follansbee, W. Va.	Riverside Ave. to Medford Hillside
D. J. Cosgro	Meadville, Pa.	Salem to Fort Edward
W. E. Carver	Washington, D. C.	Cohoes to Schenectady, N. Y.
G. L. Seidelman	Cheyenne, Wyo.	Denver to Idaho Springs, Col.
F. G. Greenfield	Lancaster, Pa.	Houston to Galveston, Tex.
Public Transit Co.	Elizabeth, N. J.	Atlantic City, N. J. and Cape May
Tri-State Express Co.	Los Angeles, Cal.	Long Branch to Red Bank, N. J.
A. Johnson	Keokuk, Mo.	Hamilton to Carthage, Ill.
Franklin Meadville Bus Line	Chicago, Ill.	Wheeling (W. Va.) to Virginia Sta.
Capital Traction Co.	Dayton, O.	Franklin, Pa., to Meadville
S. H. Pantenney		Penn. Ave. to Randle Highlands,
Conestoga Traction Co.		Dist. Columbia
United Bus Association		Cheyenne to Lake Minchaha
Los Angeles Railway		Lancaster, Pa., to Long Park
H. D. Wilkinson		Garwood, N. J. to Elizabeth
W. D. Wilson		Kahoka to Keokuk
Columbus & Dayton Trans. Co.		Chicago, Ill., to Portland, Ohio
		Dayton to Columbus, Ohio

### Applications Filed

Name	Address	Route
Colorado Motors Trans. Co.	Denver, Colo.	Denver to Silver Plume
W. T. Murray	Los Angeles, Cal.	Rowan St. to end of Stevenson Ave.
J. H. Herford		Lemoore to Murray, Cal.
A. S. Stefford		San Rafael to Logunitas, Cal.
G. A. Daggett and C. F. Moore		Hornbrook to Cupco, Cal.
I. J. Hazzard and B. J. Millard	Winsted, Conn.	Pittsfield to Great Barrington
David Peters		Conn.
The Peoples Park Bus Co.	Paterson, N. J.	Elizabeth to Linden, N. J.
Newark Bus Co.	Newark, N. J.	Beach and Clay Sts., Paterson, N. J.
Eastern Mass. St. Rwy.	Boston, Mass.	Newark to Irvington, N. J.
Bay Cities Transit Co.	Ocean Park, Cal.	No. Saugus-Reading St.
Farrar & Angeleno	Pittston, N. Y.	17th St. and Montana Ave., City
Thos. Bevan	Seranton, Pa.	Hughstown to Pittston
Joseph Puma	Pittstown, N. Y.	Harveys Lake
Georgia Rwy. & Power Co.	Atlanta, Ga.	Pittston City to Hughestown
Colorado Motor Transp. Co.	Mini, Ill.	Borough
Illini Bus Co.		To supplant street cars with bus
Albatross Tran. Co.	Peekskill, N. Y.	Denver to Idaho Springs
John Bardy	Colchester, Conn.	Illini Streets
Harry Lathorp	Willimantic, Conn.	Oklahoma City and El Reno
Joseph Hochberg	New London, Conn.	Pittman Valley to Peekskill, N. Y.
Connecticut Motor Co.		Colchester to Norwich
G. R. Gonzales		Colchester to Norwich
Alex Bridge	Butte Co., Cal.	Colchester to Norwich
A. A. Johnson	Coatesville, Pa.	Los Angeles to Arizona Line
Chester Johnson	Glendale, Cal.	Home Gardens to Walnut Park
J. H. King & C. H. King	Trona, Cal.	Westwood and Stirling City
C. C. Rhoads & F. C. Mountford		Coatesville and Avondale
E. J. Crawford		Glendale and Los Angeles, Cal.
Sequoia Nat'l Pk. Stage Co.		Los Angeles to Trona, Cal.
C. A. House		Boulder Creek to Cal. State
Wash. Interurban Rwy. Co.	Washington, D. C.	Redwood Park
Lyro Penn. Lines	Harrisburg, Pa.	Visalia and Lemon Cove, Cal.
Fred Hyserman	Albany, N. Y.	Redding and Knob, Cal.
E. J. Dorey	Binghamton, N. Y.	Extension from District line to
Mr. Leonard	Oswego, N. Y.	Bladensburg
Service & Darling Bus Line		Altoona Centre Hall
Newport Utica Trans. Co.	Newport, N. Y.	Castleton to Albany
Mid-Western Transit Co.	Chrisman, Ill.	Corbetsville, N. Y. to Binghamton
H. K. Sears		Vestal, N. Y., to Binghamton
Olho Bros.		Little Falls to Dolgeville, N. Y.
		Newport to Utica
		Deatur to Pana
		Los Angeles-Ontario
		Meadville to Conneaut Lake



## Tabular Presentation of Recent Bus Development

(Continued)

### Permits Granted

Name	City	City
Chas. J. Shaver	Camden, N. J.	Camden, N. J.
H. T. Walker	Madison, Wis.	Madison, Wis.
J. R. Seaton	Holley, Mich.	Holley, Mich.
Irrington-Roodville-Warsaw Bus Line, Inc.	Warsaw, Ind.	Warsaw, Ind.
J. Simon	Camden, N. J.	Camden, N. J.
W. M. Tries	Camden, N. J.	Camden, N. J.
A. McDermott	Camden, N. J.	Camden, N. J.
H. L. Brewer	Camden, N. J.	Camden, N. J.
Woburn-Rolling Bus Line, Inc.	Woburn, Mass.	Woburn, Mass.
S. A. Lane Motor Truck Line	Paterson, N. J.	Paterson, N. J.
Southern Ill. Bus Line	Paterson, N. J.	Paterson, N. J.
W. E. Carver	Paterson, N. J.	Paterson, N. J.
H. H. Aronson	Paterson, N. J.	Paterson, N. J.
H. Abbott	Paterson, N. J.	Paterson, N. J.
Paterson Transp. Co.	Paterson, N. J.	Paterson, N. J.
Southern Ill. Motor Bus Line Co.	Paterson, N. J.	Paterson, N. J.
S. B. Lane Motor Bus Line	Paterson, N. J.	Paterson, N. J.
Dayrville Motor Bus Express Co.	Paterson, N. J.	Paterson, N. J.
Paducah Interurban Bus Co.	Paducah, Ky.	Paducah, Ky.
Mascoutah Motor Bus Co.	Bloomington, Ill.	Bloomington, Ill.
White Company	Bloomington, Ill.	Bloomington, Ill.
Gen. City Motor Bus Co.	Bloomington, Ill.	Bloomington, Ill.
Smith Motor Bus Trans. Co.	Bloomington, Ill.	Bloomington, Ill.
Lake County Auto, Inc.	Bloomington, Ill.	Bloomington, Ill.
Westchester-White Plains Bus Line	Port Chester, N. Y.	Port Chester, N. Y.
J. F. Buckford	Port Chester, N. Y.	Port Chester, N. Y.
Wm. Fuch & Frank S. Jones	Port Chester, N. Y.	Port Chester, N. Y.
East Washington Height Traction R. R.	Port Chester, N. Y.	Port Chester, N. Y.
New Jersey Transp. Co.	Newark, N. J.	Newark, N. J.
Stephen A. Rood	Camden, N. J.	Camden, N. J.
Midwestern Transit Co.	Decatur, O.	Decatur, O.
H. C. Fisher & R. M. Fisher	Suffern, N. Y.	Suffern, N. Y.
Walter Harvey	Suffern, N. Y.	Suffern, N. Y.
Simpson Motor Bus, Inc.	Carrington, Ill.	Carrington, Ill.
John Simon	Paducah, Ky.	Paducah, Ky.
Carl Long	Dunkirk, N. Y.	Dunkirk, N. Y.
Richmond Rapid Transit Co.	Richmond, Va.	Richmond, Va.
J. J. Burns & B. Jones	Yakima, Wash.	Yakima, Wash.
The West Ridge Trans. Co.	Greensburg, Ind.	Greensburg, Ind.
Reliable Auto Bus	Denver, Colo.	Denver, Colo.
Paradox Lines	Springfield, Mo.	Springfield, Mo.
R. A. MacCartney & J. W. McSwain	Corry, Pa.	Corry, Pa.
L. F. Van Tassel	Denver, Colo.	Denver, Colo.
Dixon Chamber of Commerce	Saratoga Springs, N. Y.	Saratoga Springs, N. Y.
National Auto Transit Co.	Rock Island, Ill.	Rock Island, Ill.
E. R. Cornell	Rock Island, Ill.	Rock Island, Ill.
G. H. Barber	Monticello, Iowa	Monticello, Iowa
Brown & White Cab Co.	Charlotte, N. C.	Charlotte, N. C.
M. L. Cass	Greenville, Mich.	Greenville, Mich.
Asheville-Charlotte Bus Line	Penn Yan, N. Y.	Penn Yan, N. Y.
E. C. Higgins	Great Bend, Kan.	Great Bend, Kan.
I. J. Poe	Albany, N. Y.	Albany, N. Y.
D. Scheufler	White Lake, N. Y.	White Lake, N. Y.
United Transp. Co.	Bangor, Me.	Bangor, Me.
Northern Transit Co.	Madison, Wis.	Madison, Wis.
A. Barber	Holley, Mich.	Holley, Mich.
E. M. Rogers	Marion, Ill.	Marion, Ill.
Madison-Kilbourn Bus Line	Railway	Railway
Gay Motor Bus Line	Newburgh, N. Y.	Newburgh, N. Y.
R. E. Adis	Forest City, N. Y.	Forest City, N. Y.
Egyptian Trans. System	Barre Center, Mass.	Barre Center, Mass.
Ford Woodbridge Railway Bus Line	Canton, O.	Canton, O.
Hudson Transit Corp.	Canton, O.	Canton, O.
Scene Bus Line	Canton, O.	Canton, O.
Prescott's Bus Line	Canton, O.	Canton, O.
Steubenville Trans. Co.	Canton, O.	Canton, O.

### Twenty-four Buses to Be Run by Louisville Railway

Convinced that efficiently manned and carefully maintained buses operated by a company thoroughly responsible will be more attractive to the public than jitneys often operated by owners from whom no recovery could be had in case of accident, the Louisville Railway during June will start a bus service.

Twenty-four buses will be put into service immediately, and the plans of the company call for additions to this original fleet as rapidly as public demand justifies such action. Of the twenty-four cars, twelve will be single-deck vehicles, costing approximately \$7,500 each, now being built in Cleveland, and twelve double-deck, costing

about \$9,000 each, which will be supplied by the Yellow Coach Company, Chicago. The former will seat twenty-five persons, while the double-deck buses will have a seating capacity of sixty-eight.

The name of the company which will operate the buses is the Kentucky Transportation Company, but all of its capital stock of \$200,000 is held by the Louisville Railway. The single-deck buses bought will be upholstered in leather, finished in mahogany, with pneumatic tires, and will be painted royal blue. They will have a Bender body, on a White chassis, and will be operated on a ten-minute schedule. There will be one operator on the single-deck cars, and two on the double-deck cars. The fare will be 10 cents,

### Buses Meet Emergency

Motor Vehicles Aid Transportation During Strike of Schenectady Railway Employees. City Regulates the New Service.

SERVICE was maintained in Schenectady, N. Y., when the Schenectady Railway employees went on strike, the result of a strike. According to reports filed with the Public Service Commission, the Schenectady Railway withdrew from service a fleet of a combined seating capacity of approximately 6,000 passengers, thus leaving the city.

Anticipating the strike, the Public Service Commission John E. Cole, chairman, issued out a comprehensive list of emergency transportation. During the first two days of the strike, every sort of available vehicle was pressed into service, many of them operating with no change and no licenses being required. Mercantile and manufacturing establishments owning trucks used them to carry their help to and from work, while moving vans were converted into jitneys.

Immediately it was certain the city would be without trolley service for a period of time, Commissioner Cole took charge of the situation. All jitney operators were required to register at a fee of \$2 per car. Routes were laid out to make it possible for the great army of workers to reach their places of employment, with little confusion, on time and with the payment of a single fare of 10 cents. After this plan was put in effect the use of motor trucks to haul help to and from work was generally discontinued.

The rate for interurban service between Schenectady and Saratoga Springs, Albany and Troy was established at 50 cents per passenger, an advance of about 20 cents per passenger over the trolley rate.

Six hundred and thirty-five licensed jitneys, with more being licensed constantly, have supplied transportation facilities. The available carrying capacity of licensed jitneys is, therefore, a little more than 50 per cent of the seating capacity of the cars of the Schenectady Railway, but as the autos operate at a much greater speed than do the cars and run a "limited" service with such load to destination, they have been able to take care of more than 80 per cent of the traffic with satisfaction. The short-haul passenger was walked.

The licenses are issued for the duration of the strike, or, of course, until a court order may determine that they cease, should the outcome of the trouble result in the railroad attempting to operate cars without a settlement with its present workers.

All in all, the situation in Schenectady is very much better than in Albany two years ago during similar circumstances, when, according to reports, closed the doors and more than a dozen large business houses suffered serious financial reverses, some of them being forced into the hands of a re-

ceiver as the result of the loss of business entailed by the strike on the United Traction Company lines. In the Albany case the city administration itself did not co-operate in furnishing adequate jitney service and people only came down town when it was absolutely necessary.

Just who would be ultimately responsible for an accident under jitney operation in Schenectady constitutes a fine legal question. The city has undertaken to supply transportation facilities and has licensed auto operators to carry passengers; it has not made the

ability of the operator to liquidate a loss a condition of the governing issuance of a license. Insurance companies are not writing jitney risks in Schenectady, and with the exception of the few auto buses which are operating, practically all cars are without liability protection. It is a controversial question as to whether, in case of a serious accident, the city, having authorized the jitney to operate in the city as a means of transportation by its license, would not be financially responsible, if the driver were not, for public liability.

unprofitable routes throughout the year if small undertakings that had not shared the burden of the day in pioneer work were allowed to run vehicles during the hours of dense traffic only. It was only by earning sufficient revenue at the peak hours that companies were able to run all the year round time-table services and gradually make extensions which very often were non-paying for long periods.

### De Luxe Bus Service Started in Milwaukee

De luxe motor bus service was started in Milwaukee, Wis., on May 2 by the Wisconsin Motor Bus Lines, a subsidiary of the Milwaukee Electric Railway & Light Company. The company placed in operation on that date ten twenty-five-passenger, single-deck, type "J" Fifth Avenue Coaches and one fifty-two-passenger, double-deck, type "L" Fifth Avenue Coach. Announcement was made at the same time that nine additional double-deck buses now on order with the Fifth Avenue Coach Company are expected very shortly and will be placed in service as quickly as received, replacing or supplementing the single-deck buses.

The route chosen follows some of the finest streets in Milwaukee, tapping the exclusive east and west side residential districts and passing along Lake Michigan and through the downtown business district. A fare of 10 cents is being charged. So far as possible loading is to be limited to the seating capacity of the buses. The buses will be operated independent of the railway system and there will be no interchange of transfers or tickets.

### Off to the Ball Game a la Bus

The Johnson Bus Line, Waterloo, Ia., is planning to make a number of trips this summer to cities where ball games are being played. A White Sox special is being arranged for July 9. The big bus will leave Waterloo on that date with a delegation of White Sox fans to attend the White Sox-Yankee game at Chicago on July 10. The party will leave Waterloo early on July 9, arriving in Chicago that night. The morning of July 10 the party will be taken on a sightseeing trip. The price for the trip, including a reserved seat for the game, will be \$15.

**Wichita Line to Be Improved.**—Earl Goodrich, owner and operator of the bus line operating between Valley Center and Wichita, Kan., will add a new bus to take care of increased business. Mr. Goodrich is at present operating one bus between these terminals, making six trips a day, but he is now ready to put on another bus, and double the schedule. The route covers a distance of 12½ miles. The fare charged is 25 cents one way and 50 cents round trip. Since he started the line some six months ago Mr. Goodrich has not missed a trip and has only been off schedule once during this period.

## British Bus News Summarized

Trackless Trolleys for Wolverhampton—Question of Road Taxes Agitated Again—Rules Set Down for Orderly Bus Operation—Motor Exhibit Planned for November

**A**NOTHER example of the substitution of the trackless trolley for the tramway is furnished at Wolverhampton. The Town Council of the borough has approved a scheme for a service of railless trolley cars on one of its tramway routes, a single track line. It had been proposed to double-track the line in order to relieve congestion, but after expert advice it was resolved to adopt the trackless trolley system. That will give the effect of a double track. The estimated cost is £15,000. Six trackless trolley cars are to cost £8,700. The Tilling-Stevens type of chassis will be employed.

The London General Omnibus Company gave a demonstration on April 13 of a headlight which it has adopted for country services where public lamps are few or non-existent. The lens adopted diffuses part of the light laterally and deflects the beam below the eye level so that there is no dazzle higher than 42 in. At the same time the light is projected far enough ahead along the road surface to insure safety. This type of lens has been approved by the London Metropolitan Police. It produces the effects described by means of a special arrangement of corrugations.

Perhaps the following Hull regulations for buses may be of interest for comparison with regulations in force in America. This set of instructions has been compiled by the Hull & District Heavy Vehicle Defence Association in conjunction with the local police, and the rules have been approved by the chief constable and issued by his authority. Other regulations have also been framed for coach traffic, but those relating to buses are as follows:

1. Omnibuses are to occupy stands authorized by the police.
2. Two opposite vehicles for one destination are not to be on the stand at the same time.
3. When an omnibus leaves the stand, the stand is open to the vehicle next timed to leave.
4. All omnibuses must be run strictly according to the time table sanctioned by the police.
5. Departing Vehicles.—The following rules will apply: (a) if a bus is on the stand before time of departure, it must leave strictly on time.

(b) If bus arrives on time of departure it must set down and pick up its load without delay, and leave the stand as quickly as possible.

(c) If bus arrives more than five minutes after time for departure, it may set down, but cannot pick up, and must leave the stand.

In consequence of opposition from motor interests the Potteries & North Staffordshire Tramways has withdrawn a clause from its Parliamentary bill which would have prohibited bus competition with the company's tram cars and buses. For the same reason the Stoke-on-Trent Town Council has modified a proposal to impose driving tests on drivers of all motor vehicles applying for license. It is now proposed that the tests will be confined to drivers of vehicles plying for hire.

Emanating from Lancashire, there is now under discussion a scheme for getting over the trouble of rate-cutting among competitive firms engaged in the road transport of passengers and goods. The idea is to form a motor transport association into a trade union, any members of which may be penalized if they carry goods or passengers at charges below an agreed standard scale. The trade union would be registered as such and would be able to adopt any measures that any trade union is legally allowed to adopt to enforce its rules and regulations. The ruler would take power to inflict fines and penalties for breach of the rules. Members would be allowed to bring matters before a committee which might sanction any new rate for special jobs or special traffic. What is to be done in the case of "pirates," or those not members of the association, does not seem to be mentioned.

The Society of Motor Manufacturers & Traders has decided to organize an exhibition to be held in London from Nov. 22 to Dec. 1 next, embracing not only the various types of commercial motor vehicles but also plant, machinery and materials used in the construction, maintenance and development of roads. Thus it is hoped to draw road user and road maker closer together.

C. Shirreff Hilton, chairman of the British Automobile Traction Company, speaking at the annual meeting on the subject of competition, said that it was impossible to render service on many

## Meaning of Term "Common Carrier" Questioned by Pennsylvania Commission

A new question has risen before the Public Service Commission of Pennsylvania in connection with bus regulation. Its settlement may complicate the adjustment of a jitney suit which had been before the commission for months, and in the end provide a means whereby all the operators who have been refused certificates of convenience may get back into business legally.

During the hearing of a complaint filed by Wayne W. Kroh and Jackson B. Stambaugh, licensed operators in Hanover, it was alleged that W. R. Moul has been operating as a common carrier without having first secured a certificate of public convenience.

It developed that Moul does not drive the cars but merely rents them out to people who have drivers' certificates. Both the Hanover jitney men testified that Moul is taking all their business away from them. They have complied with all the requirements of the commission and they have asked that he be stopped.

Mr. Moul contended he was entirely within the law in his operations. His attorney, Charles Ehrhart, explained there was nothing in the laws of the commonwealth to prohibit applying the old livery stable plan for the hiring of automobiles.

Years ago the courts ruled that a man who conducts a livery stable, hiring teams out, in the same fashion that Mr. Moul is renting his cars, is not a common carrier. Whether there is any way in which the commission can control Moul's operations is doubtful. His cars are operated under commercial vehicle licenses granted by the State Highway Department, and it is said there is a possibility some control may be exercised over his operations through that department.

Mr. Moul averred that his cars were used almost exclusively by joy riders. He said his only requirement was that the persons engaging the auto make a deposit of \$10 and show a driver's license. If they turned the car over to some one else who was not authorized to drive it that was beyond his control.

Recently one of his cars was wrecked in Frederick Street by a minor brother of Chester Hostetter. The older brother rented the car, it was charged, and then turned it over to the youth, who upset while driving with his girl. The girl was thrown out, and another machine was wrecked.

The Public Service Commission took the case under advisement.

**Old Time Speed King Now Bus Owner.**—Webb Jay, inventor of the Stewart vacuum system, and driver of the famous "Whistling Billy" steam racing car, has installed Fageol parlor car service between the millionaire colony in Miami, Fla., and the fishing resorts down the coast.

## Financial Section

### Some California Bus Operating Costs

OPERATING statistics for sixty-four companies that earned more than \$20,000 for the year 1922 show the magnitude of the earning power of the motor bus and truck in California. These companies together earned a little more than \$7,750,000 for the year, approximately \$6,800,000 of which was from the haulage of passengers. Unfortunately, the reports filed with the California Railroad Commission were not complete in all items and comparative totals could not be established for all these companies. With but one exception, however, all companies showed a profit for the year.

#### 14,000,000 PASSENGERS CARRIED

Complete information from forty-two companies operating 578 vehicles, with a total capacity of 8,228 seats, indicates a net income of slightly more than 20 per cent on the amount of capital invested in plant and equipment.

Gross revenue for the year for these same companies totaled \$6,032,827 or 1.69 times the investment in plant and equipment. Revenue from the transportation of passengers was \$5,312,752 or 88 per cent of the total money earned from all sources. The number of passengers carried averaged 0.607 per bus-mile and totaled 13,947,843. The average fare paid by each passenger was 38 cents. The 23,000,000 bus-miles run during the year showed an earning power of 23.2 cents.

The expenses of operation as shown are not entirely indicative of the cost of passenger vehicle operation inasmuch as the costs of handling allied traffic, such as freight, express, etc., are not separately shown. However, it is interesting to note that of the operating costs, which totaled 92.7 per cent of the gross earnings, 46.5 per cent was spent for conducting transportation, 36.5 per cent for maintenance, 1.6 per cent for advertising for traffic, and 15.4 per cent for the conduct of the business, including general and miscellaneous expenses.

#### EXPLANATION OF TABLE HEADINGS

An analysis of the size of motor buses or stages used by the sixty-four companies reporting indicates that the eighteen-passenger vehicle is the most popular. Next follows in the order of popularity the fourteen, twenty-five, eleven, twenty and eight-passenger vehicle. This is considered an interesting commentary on public taste.

A word, explaining what is included in each account, is necessary if the figures are used for comparative pur-

poses. The table in the column headed "gross revenue" covers all fees collected for the transportation of passengers, freight, express, baggage, U. S. mail, the rent received from station cars, automobile storage, parking, buildings and other property owned, rents from bus-chained advertising on buses and in terminal. The proportion collected from transporting passengers is shown separately in the column which is headed "Passenger Revenue."

#### THIRTY-FOUR DETAILED OPERATING ACCOUNT

The cost of operation is divided into four parts, which when added together give the total operating expense. The items included in "Conducting Transportation" cover primarily an expense incidental to running the bus on stages over the routes. In detail this includes the salary of the engaged to supervise the actual bus operation; the wages of drivers of both passenger, express, baggage, freight and mail-handling vehicles; gasoline; oil; grease; the total cost of keeping and operating service cars or wreckers; the wages of terminal employees whether engaged in passenger or freight handling; claims paid on account of loss and damage to freight and baggage transported; garage labor and expenses, and any other expenses in connection with the handling of traffic.

"Maintenance" covers the cost of labor and material used in repair of buildings used in transportation operations whether owned or rented, the repairs to machinery used in the shops and garages, the cost of tires and tubes and other material used, the salaries and wages of those engaged in the repair of revenue cars, both passenger and freight, and all other expenses incurred in keeping such cars in efficient working order. The cost of inspecting and testing after repairs have been made to determine if everything is all right is also included under the general heading. All allowances if any for depreciation of buildings, machinery, tools, vehicles, etc., are likewise included in the statement of this account.

"Traffic" covers expense incidental to the acquisition of business such as solicitation, the cost of printing and publishing time-tables, newspaper advertising, donations made for traffic purposes and for entertaining conventions and similar expense. "General and Miscellaneous Expenses" covers the cost connected with managing the business and conduct of the general office such as salaries and expenses of officers and clerks; supplies, and expense of maintaining the office; stationery and supplies such as letter-heads, tickets, fare receipts, waybills, etc.; the cost of running the general storeroom; premiums on fire, fidelity, burglary or liability insurance policies or reserve allowance if the company carries its own insurance. Payments for personal injuries or property dam-

age, and the expenses of adjusting claims, law expenses including salaries of attorneys and others engaged in litigation, taxes except federal income taxes assignable to operation, rents paid for the use of terminals, buses or stages, uncollectible bills, etc., are all included under this heading. Other

expenses of a general nature that apply to the property as a whole are charged to this general account.

These four main accounts, covering in all thirty-four separate items, added together make the total shown in the column headed "Total Operating Expenses." The column headed "Net

Income" shows the profit and loss for the year which is applicable to dividends after non-operating income and expenses, which include interest on funded debt, federal income taxes, amortization of debt discount and expense incidental thereto, have been deducted.

## Operating Statistics of California Motor Bus and Stage Lines, Year Ended Dec. 31, 1922

Key No.	Name of Company	Operating Expenses											Investment
		Vehicles and Seats†	Gross Revenue	Passenger Revenue	Conducting Transp.	Maintenance	Traffic	General and Misc.	Total	Net Income	Passengers Carried	Passenger Bus-Miles	
<b>Class A-1 Companies with gross revenue over \$100,000 per annum.</b>													
1	Motor Transit Co. ....	88— 1,457	\$1,461,436	\$1,343,501	\$614,236	\$611,701	\$21,729	\$221,993	\$1,469,668	\$176,591	2,139,449	5,592,333	\$904,616
2	California Transit Co.* ..	69— 1,192	843,871	811,042	310,350	300,210	14,760	109,261	784,581	119,900	771,428	2,897,377	616,771
3	Pickwick Stages, No. Div.* ..	44— 569	582,643	274,445	280,232	183,608	7,100	47,136	518,076	66,987	160,355	2,135,669	290,813
4	Peninsular Rapid Transit Co.* ..	28— 567	453,849	450,763	203,738	139,066	5,618	80,096	428,518	35,144	NR	NR	285,771
5	Valley Transit Co.* ..	39— 545	417,680	402,390	134,542	179,430	7,242	53,588	374,802	58,217	388,369	1,738,539	238,931
6	The Crown Stage Line* ..	42— NR	362,023	344,231	157,568	122,638	2,672	58,420	341,298	22,313	1,009,399	1,778,899	124,581
7	Pickwick Stages, Inc.* ..	18— 198	266,749	232,234	198,714	43,065	2,534	22,272	266,585	3,823	143,542	521,260	65,776
8	B. & H. Transportation Co.* ..	37— 839	264,542	259,428	138,817	85,515	532	32,971	257,835	7,289	5,226,558	1,272,028	195,900
9	Yosemite National Park Co.* ..	41— 487	NR	256,642	83,914	83,944	26,595	25,816	220,269	NR	120,448	258,027	NR
10	Santa Rosa, Petaluma, Sausalito Auto Stage Co.* ..	13— 234	150,654	143,538	63,079	15,329	4,132	20,316	102,856	47,798	130,879	542,110	101,760
11	McConaha's Official Auto Service* ..	16— 154	149,636	79,988	58,860	63,744	406	18,867	141,877	15,804	31,732	212,444	41,511
12	Original Stage Line* ..	14— 287	136,820	134,793	58,223	45,953	198	19,041	123,415	13,405	445,478	822,841	73,791
13	Pacific Auto Stages, Inc.* ..	16— NR	129,584	129,487	52,575	42,009	3,221	20,129	117,934	15,500	162,978	NR	96,411
14	United Stages, Inc.* ..	10— 113	129,447	124,433	64,782	37,136	1,982	21,304	125,204	19,477	161,497	560,143	82,321
15	Yosemite Transit* ..	16— 188	129,306	127,947	44,321	32,394	67	8,452	105,234	26,267	49,246	373,030	54,670
16	Pierce Arrow Stage** ..	21— 265	126,099	90,451	28,008	53,597	NR	11,958	93,363	NR	50,766	360,000	115,921
17	Modera Yosemite Big Tree Auto Co.** ..	20— 152	111,822	110,922	47,885	15,653	16,231	5,931	85,700	32,381	7,472	160,511	84,411
<b>Total .....</b>		<b>532— 7,247</b>	<b>\$5,716,161</b>	<b>\$5,316,235</b>	<b>\$2,539,844</b>	<b>\$2,075,001</b>	<b>\$115,019</b>	<b>\$777,551</b>	<b>\$5,507,415</b>	<b>\$660,896</b>	<b>11,899,596</b>	<b>19,225,211</b>	<b>\$3,374,031</b>
<b>Class A-2 Companies with gross revenue from \$50,000 to \$100,000 per annum.</b>													
18	Dillingham Transportation Co.* ..	12— 293	\$83,866	\$75,016	\$32,720	\$17,264	\$4,245	\$19,441	\$73,670	\$10,196	198,324	NR	\$80,971
19	Redding-Fall River Stage Line* ..	5— 74	77,184	34,746	33,581	38,581	NR	5,672	77,834	NR	9,791	144,800	23,651
20	Valejo Bus Co.* ..	8— 155	69,002	68,902	35,143	17,806	849	14,731	68,529	2,646	690,542	322,785	32,481
21	Shasta Transit Co. (b) ..	10— 155	65,267	64,314	37,672	23,173	NR	7,136	67,981	NR	49,281	446,480	30,501
22	River Auto Stage* ..	6— 86	61,901	60,968	33,926	4,720	NR	15,466	54,112	NR	85,200	274,840	26,711
23	Pasadena Ocean Park Stage Line ..	10— 182	60,252	60,169	25,479	23,047	1,557	11,247	61,330	1,078	240,638	404,896	48,681
24	Packard Stage Line ..	8— 64	56,658	56,658	57,778	NR	1,042	10,096	68,915	NR	15,607	401,915	NR
25	Red Star Stage Line* ..	5— 59	55,305	52,752	28,537	8,472	3,622	9,232	49,863	NR	24,586	161,816	26,331
26	Redding-Weaverville Stage* ..	4— 26	50,825	11,708	21,261	20,606	NR	10,001	51,868	NR	1,952	1,416	425,251
27	Golden Eagle Barker Stage* ..	8— 132	50,134	49,434	15,504	19,945	NR	11,824	47,273	7,662	74,465	200,750	43,001
<b>Total .....</b>		<b>76— 1,226</b>	<b>\$630,394</b>	<b>\$514,667</b>	<b>\$321,601</b>	<b>\$173,614</b>	<b>\$11,315</b>	<b>\$114,846</b>	<b>\$621,376</b>	<b>\$21,582</b>	<b>1,390,386</b>	<b>2,359,698</b>	<b>\$337,591</b>
<b>Class A-3 Companies with gross revenue from \$20,000 to \$50,000 per annum.</b>													
28	A. C. McVey Stage Lines* ..	7— 95	\$48,358	\$46,512	\$15,198	\$16,099	\$513	\$6,964	\$38,774	\$9,937	72,328	189,451	\$31,101
29	Sacramento-Auburn-Nevada City's Stage Line* ..	8— 137	45,694	44,303	17,542	10,430	158	13,072	41,202	4,902	53,811	123,666	34,321
30	Scott's Stage Line* ..	6— 54	45,494	45,464	34,858	7,975	NR	1,957	44,790	705	8,875	150,000	42,021
31	Etna Mills-Forks of Salmon Stage Line* ..	3— 21	45,222	4,292	24,700	4,012	NR	2,598	31,310	13,912	1,481	198	1,321
32	Murrieta-M. H. Springs Auto Stage Line* ..	5— 64	44,918	41,976	18,375	25,751	855	10,045	55,026	9,770	19,826	299,520	53,751
33	Coast Line Frit. and Stage Co.* ..	5— 58	44,802	18,555	14,745	5,292	1,295	20,749	42,081	2,855	NR	NR	19,571
34	Auto Transit Co.* ..	6— 96	39,782	39,632	NR	NR	NR	36,069	36,069	3,713	17,278	179,052	25,651
35	White Star Auto Stages* ..	5— 40	39,499	28,836	27,331	3,697	242	4,033	35,353	4,187	6,422	189,607	3,501
36	Joe Miller Stage Line ..	7— 90	38,395	36,940	21,931	5,255	251	7,633	35,070	3,325	68,483	282,773	42,331
37	Santa Cruz Stage Co.* ..	6— 73	37,102	36,613	13,896	6,4589	1,102	9,009	30,465	7,296	29,642	125,260	25,801
38	San Joaquin Los Banos Stage Co.* ..	5— 65	36,563	35,609	15,196	15,880	381	3,594	35,051	4,032	25,853	219,540	10,631
39	Boyd & Matty* ..	3— 55	36,016	34,104	7,349	9,797	35	6,395	23,576	13,761	22,873	107,200	18,771
40	W. R. Miles Stage Line* ..	7— 63	35,962	25,737	11,533	14,205	422	8,966	35,126	4,010	16,744	119,516	23,691
41	Kern County Transportation Co.* ..	4— 68	35,122	33,739	11,225	10,545	NR	11,192	32,962	2,160	22,986	107,200	18,971
42	Dunham Auto Stage Co.* ..	6— 79	35,045	34,320	8,543	19,202	215	7,577	35,537	NR	27,376	113,847	31,261
43	Pacific Auto Stage Co. ..	10— 140	33,800	33,800	12,964	13,160	1,403	5,666	33,193	753	33,273	NR	39,431
44	Lloyd's Transportation Co. ..	4— 70	30,026	27,679	16,032	4,074	NR	13,172	33,278	NR	141,518	201,692	12,181
45	Verdugo-Hills Transportation Co.* ..	8— 120	29,575	29,460	14,617	14,276	140	9,706	38,739	8,957	60,770	192,728	30,091
46	West Coast Rapid Transit Co. ..	7— NR	28,553	28,553	15,168	10,676	80	2,402	28,326	NR	NR	NR	15,351
47	Bernicia Vallojo Stage Line ..	8— 137	28,416	28,416	12,443	9,597	208	4,582	26,830	1,586	159,715	91,882	31,101
48	F. F. Nellist Stage Line* ..	4— 76	26,710	23,974	10,573	14,600	NR	7,053	32,226	4,422	47,168	74,140	25,551
49	Mt. Wilson & Arroyo Seco Stage Lines* ..	7— 95	25,794	20,906	8,631	12,275	518	5,003	26,427	633	28,942	41,217	19,281
50	Fresno Coalinga Stage Line* ..	6— 66	25,303	24,670	10,491	7,247	369	3,833	21,940	3,675	15,713	142,882	26,021
51	Compton Transportation Co. ..	10— 183	24,908	24,998	9,507	10,347	38	8,037	27,929	2,860	69,777	NR	39,201
52	Ojai Ventura Stage Line* ..	8— NR	24,700	11,014	12,353	9,133	NR	4,784	26,270	1,116	12,238	NR	601
53	Citizens Auto Stage Co.* ..	4— 46	24,254	9,055	16,482	9,161	NR	1,629	27,272	2,395	1,851	21,000	16,741
54	Houck & Pinetel ..	4— 94	24,163	24,163	12,125	5,345	NR	6,830	24,300	137	191,269	124,996	18,861
55	Chico-Weaville-Susanville Stage* ..	4— 64	24,147	23,339	2,822	6,083	413	1,913	11,231	NR	4,836	37,776	16,911
56	Cregaro Stage Lines* ..	4— 46	23,321	21,002	17,866	2,331	290	2,784	23,271	NR	29,400	165,560	NR
57	Holbrook & Shuler ..	4— NR	23,154	23,154	8,775	4,619	NR	8,125	21,519	1,635	231,543	214,400	9,661
58	Redondo-San Pedro Stage Line** ..	5— 92	23,044	22,764	12,096	10,267	NR	4,077	26,440	NR	NR	NR	18,365
59	Smith & Ramsey Stage Lines* ..	7— 66	22,758	19,114	4,998	4,703	NR	9,943	19,644	4,953	48,210	NR	10,241
60	D. L. Zahner's Stage Line* ..	3— 50	22,037	20,577	12,941	5,156	NR	1,887	19,984	NR	29,746	100,000	13,431
61	Riverside & Santa Ana Stage Line ..	4— 72	21,619	21,332	6,482	8,842	72	6,122	21,518	400	31,652	108,720	15,601
62	Allen & Reece ..	3— 55	21,336	21,336	13,278	3,286	395	4,354	21,313	2,287	49,220	98,550	10,151
63	Los Gatos-San Jose Bus Line ..	4— 59	20,891	20,891	9,637	6,127	20	2,063	17,847	3,045	140,000	162,672	13,351
64	Alturas & Cedarville Stage Co.* ..	2— (c) 4	20,338	2,410	2,926	NR	NR	NR	NR	2,419	804	31,300	NR
<b>Total .....</b>		<b>193— 2,593</b>	<b>\$1,157,001</b>	<b>\$989,239</b>	<b>\$485,679</b>	<b>\$325,903</b>	<b>\$9,415</b>	<b>\$263,818</b>	<b>\$1,081,889</b>	<b>\$115,994</b>	<b>1,699,736</b>	<b>3,853,345</b>	<b>\$764,889</b>
<b>Total—All Companies .....</b>		<b>801— 11,066</b>	<b>\$7,503,556</b>	<b>\$6,820,141</b>	<b>\$3,347,124</b>	<b>\$2,574,518</b>	<b>\$135,749</b>	<b>\$1,156,215</b>	<b>\$7,210,680</b>	<b>\$797,472</b>	<b>14,989,718</b>	<b>25,438,254</b>	<b>\$4,477,516</b>
<b>Total 42 Companies full information .....</b>		<b>578— 8,228</b>	<b>\$6,032,827</b>	<b>\$5,312,752</b>	<b>\$2,611,041</b>	<b>\$2,051,076</b>	<b>\$88,375</b>	<b>\$862,878</b>	<b>\$5,613,470</b>	<b>\$722,646</b>	<b>13,947,843</b>	<b>22,942,121</b>	<b>\$3,565,315</b>

(a) Estimated (b) Carries newspapers. \* Also carries freight or express. \*\* Carries U. S. mail under contract. NR—Not reported.  
(c) Includes garage revenue. (d) Approximate only. (e) These are trucks, passengers ride on driver's seat. † Number of buses and stages and total seats.

# Bus Regulation



## More States Regulate Bus

Ohio, Iowa, North Dakota, Montana, Michigan, West Virginia and Texas All Established New Measures at the Recent Legislative Sessions

**A**SIDE from the bills to tax gasoline introduced at the recent sessions of the Legislatures several bills were passed looking toward a strengthening of the laws having to do with the regulation of bus operation. It must be remembered that in many states all public service common carriers have long been under commission jurisdiction as to the matter of securing certificates of convenience and necessity, etc., so that the general laws recently passed must be regarded not from the point of view of their number, but from that of their contents. General regulatory bills have passed and secured executive sanction in Ohio, Iowa, North Dakota, Montana, Michigan, West Virginia and Texas.

Bus regulatory measures failed to pass in Indiana, Colorado and Utah. Strictly speaking these failures may be regarded as negative news. In this connection the legislation in New York, which by the way failed, must be regarded in somewhat different light from that of all the other measures either passed or defeated. Entirely aside from the question of the merits or demerits of the provisions of the bill wrapped up in the program of transit legislation for New York City, the bill ran counter to the trend of economic legislation. In it it was sought to retain for Mayor Hylan of New York the right to put on buses without the need for securing certificates of convenience and necessity from the New York Transit Commission, a state-created body.

The failure of this measure has balked the professed program of the local city administration to carry out a \$25,000,000 bus plan, particularly as the commission, while admitting the place of the bus in city transit, has expressed itself to the effect that it is opposed to duplications of transit facilities, particularly where the existing agent is giving adequate service or is in a position to render such service.

A few measures did get through in New York affecting the bus men in a minor degree. Perhaps the most important measure of these now before the Governor for signature is the bill amending the insurance law relative to mutual casualty insurance corporations. Under this measure bus owners expect to secure mutual insurance.

At first sight some of the measures just passed appear to be somewhat drastic in their provisions, but certainly in the case of Ohio, where a battle royal waged over the matter of

regulating the bus, the measure that was finally passed may reasonably be looked upon as a really stabilized step in a forward direction. A summary of the principal recent legislation follows:

In all of the bills the bill places under the jurisdiction of the State Railroad Commission. Reports of the commission filed with the Legislature are the right to operate bus lines is confined to those who secure certificates of convenience and necessity, but in this respect those operating under the law were passed were not affected. In granting such rights the commission is to judge whether or not the existing means of transportation are sufficient. Control of the buses is taken away entirely from local authorities.

Taxation rates carried in the bill represent a considerable reduction over the original schedule which was presented to the General Assembly and the final rates represent a compromise between traction and bus men after the Senate and House had disagreed on rate amendment. These final rates are as follows: Motor buses operating between fixed termini, seven passengers or less, \$40 for each bus, eight to twelve passengers, \$90, thirteen to eighteen, \$140, nineteen to twenty-four, \$180, more than twenty-four, \$230.

Buses not operating between fixed termini, seven passengers, \$20, twelve, \$40, eighteen, \$70, twenty-four, \$115, more than twenty-four, \$150.

The Iowa bill places intercity motor carriers, hauling either freight or passengers, under the supervision of the State Railway Commission. Not only will buses and motor trucks be subject to regulation as to rates and charges, but they will be compelled to pay taxes for the upkeep of the roads over which they travel.

The law affects all motor carriers traveling over definite routes hauling either persons or property. It is specifically worded to include gasoline trucks which follow a fixed route but excludes trucks used for carrying farm and dairy produce.

According to the terms of the law the Railroad Commission is authorized to fix rates for the operation of buses for the protection of the public and also to investigate and determine reasonable rates. Before an operator can place a bus or truck in service he must first obtain a certificate for doing business from the Railroad Commission. The bus men succeeded in killing by amendments some of the most drastic features of the bill as originally introduced, but were not strong enough to smother the bill.

As in Ohio, the new Iowa law, in addition to vesting the Board of Railroad Commissioners with authority to supervise and regulate motor vehicles not operated wholly within the limits of any city or town, requires them to obtain from it certificates of convenience and necessity. It imposes the following taxes in addition to the regular license fees or taxes imposed on motor vehicles in the state:

Motor vehicles having pneumatic tires, one-eighth cent per ton-mile of travel over and along the public highways.

Motor vehicles having hard or solid tires, one-fourth cent per ton-mile of travel over and along the public highways.

Passenger ton-miles are to be figured by taking the maximum seating capacity of the vehicle including trailers, at 150 lb. per passenger seat, plus the weight of the vehicle, while freight ton-miles are to be found by taking the maximum freight carrying capacity of the truck plus the weight of the vehicle.

The maximum weights permitted, including the weight of the vehicles, are 14,000 lb. for vehicles with solid rubber tires, and 20,000 lb. for vehicles with pneumatic tires.

The taxes collected are to be used for the maintenance and repair of the highways and streets over which the carrier operates. The law provides that the money shall be allocated to the various city and county road districts in the same proportion as the mileage operated is distributed among the districts.

All motor carriers are required to file with the Railroad Commission liability insurance bonds, in form and amount to be determined by the commission, to provide compensation for injuries and damages for which they are liable, and also a bond satisfactory to the commission to guarantee payment of all fees, taxes or charges due to the state and for the faithful performance of the service it undertakes.

The commission is authorized to adopt and enforce such safety rules and regulations as in its judgment may be necessary. The act prescribes that drivers of motor carriers must be more than twenty-one

years of age, must be licensed by the commission, and must be provided with a certificate of fitness from a physician. The law also requires that all motor carriers must be provided with a certificate of fitness from a physician.

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venience and necessity from the State Road Commission. If the proposed routes are within any city or town a permit must be obtained from the local authorities to apply to the road commission for a certificate. In such case the local authorities may prescribe such regulations covering traffic rules, parking, etc., as they may think proper.

The State Road Commission is authorized to prescribe the route, territory, schedules, fare or tariff, to require reports of operation and service and any other data which may be found desirable. Bond or liability insurance to cover compensation for injuries and damages is also required.

The following fees are payable to the commission under the act:

Passenger buses less than 3,000 lb., one-twentieth of a cent per passenger seat-mile operated during the year for which certificate is issued as shown in the proposed schedules filed with the commission.

Passenger buses 3,000 to 7,000 lb., one-fiftieth of a cent per passenger seat-mile obtained in the same way.

Passenger buses of more than 7,000 lb., one-tenth of a cent per passenger seat-mile. Buses not running over a regular route between fixed terminals pay \$75 yearly.

The Oklahoma Corporation Commission has power to make rules and regulations governing the service rendered by "motor carriers" in Oklahoma, under authority given in Senate Bill 341, passed by the recent Legislature. Powers to be exercised by the commission under this act are liberal in nature, it is pointed out by the commission, and the commission's interpretation of the law has been upheld by the Attorney General. Under the law regulating the scheduled motor carriers the latter are required not only to conform to rules of service, but they must give bond against casualties to passengers as well as freight.

The Texas law provides that all motor vehicles be registered for the purpose of collecting tax fees. The fee for registration is based on weight and N.A.A.C.C. horsepower rating. The fee per horsepower is fixed at 17½ cents per horsepower for all vehicles. The fee based upon the weight of the vehicle ranges from 40 cents per 100 lb. or fraction thereof for vehicles weighing from 1,000 to 2,000 lb., to 75 cents per hundred for vehicles of more than 4,501 lb. The fee for motor buses for hire is 17½ cents per horsepower and weighed on the same basis as passenger cars, plus \$4 for each passenger the vehicle will seat.

No motor vehicle will be allowed on the highway whose gross weight exceeds 650 lb. per inch width of tire, or more than 6,000 lb. on any wheel, or whose body is wider than 90 in. No vehicle will be permitted to operate with more than 10 per cent over its registered capacity.

Other provisions are briefly as follows: Vehicles must be equipped with rear view mirrors. No vehicle allowed to operate on the highway if equipped with solid tires less than 1 in. wide. No pneumatic tired vehicle will be permitted to operate on the highway with one or more tires removed from the wheels.

Penalties for violations of the laws provided shall not be less than \$10 nor more than \$200 or more than thirty days in jail. The country road superintendent is authorized to post notices that will prevent operation of vehicles on roads when operation would be likely to damage the highway or be unsafe due to wet weather, recent construction, or repairs. Operators affected by these notices will be compelled to detour.

In case of violations any individual may make written complaint to the county judge, who has full authority to make decisions in this case.

Operators are liable for damages to highway property. The speed law provides for a maximum of 35 m.p.h. in the open country and 20 miles in the city limits.

Among the measures passed taxing gasoline are the following:

A bill in Massachusetts to impose a tax of 2 cents a gallon. The purpose of this bill is "to provide funds toward the cost of construction and maintenance of highways and bridges."

The state of North Carolina has amended its bill taxing gasoline by striking out the words "1 cent," and inserting the words "3 cents," so as to increase to 3 cents a gallon the tax upon motor fuel.

West Virginia has imposed a gasoline tax of 2 cents a gallon. The new law goes into effect ninety days from April 26.

A bill in Texas to impose a state occupation tax of 1 cent a gallon on gasoline. The law says that the tax imposed "upon what is commercially known as gasoline and all substitutes therefor by whatever known name, sold, manufactured, refined

derived, prepared or compounded from petroleum."

A tax of 2 cents a gallon on gasoline will be imposed, effective June 1, as a result of legislation just passed in Indiana.

A tax of 3 cents a gallon has been imposed on gasoline in Virginia.

A tax of 2 cents a gallon on gasoline imposed by the Legislature of Tennessee has caused considerable confusion. The Commissioner of Finance and Taxation has ruled that the tax should be imposed upon the dealer and not the consumer. Many dealers have advertised: "Gasoline 24 cents, tax 2 cents; 26 cents." It has been ruled that such signs are against the law and that dealers carrying such signs are liable to prosecution. It was intended that the tax imposed should be a privilege tax.

## Court Defines Speeding

Popular Belief That Thirty Miles an Hour Was Speed Limit Has Been "Knocked in the Head" in Ohio

A DECISION of interest to all motor bus operators in Ohio was handed down on May 25 by Judge E. P. Middleton of the Champaign County Common Pleas Court. In the case of the State vs. A. E. Larrick, Red Star bus operator, the court held that the state auto code prescribes no set speed limit for automobiles outside of municipalities, and that convictions under the code must depend on whether the rate of speed at which the defendant operates his automobile is unreasonable and improper beyond a shadow of doubt.

Mr. Larrick, charged with speeding, was found not guilty by the court, although the evidence showed, and the defense did not dispute it, that the bus was being operated at a speed ranging from 40 to 52 m.p.h. in the country roads north of Urbana, Ohio, at the time the arrest was made.

The decision of the court is expected to clarify the speed situation in Ohio, where considerable confusion has reigned over interpretation of the state auto code as it relates to speed limits. Bus drivers throughout the state, especially in the thinly populated districts, have been hampered in maintaining their schedules due to the operations of the speed cops, whose sole aim appeared to be to arrest and haul before a magistrate for fine every motorist who exceeded a speed of 30 m.p.h. regardless of the conditions at the time. These cases were all handled in the justice of peace courts, and it was for this reason that the indictment and trial of Mr. Larrick was welcomed.

By agreement between prosecution and defense, a jury was waived and the matter left to the court to decide strictly on the legal points at issue with the result that the popular belief that 30 m.p.h. was the speed limit was "knocked in the head." In effect, the court held that so long as the road was clear and in good condition, and that the car was in good mechanical condition, the only limit to be imposed was that of the car's power. However, the court pointed out, under certain conditions, where roads were bad, and traffic heavy, a speed of much less than 30 m.p.h. might be unreasonable and improper and for that reason a violation of the state code.

## Book Reviews

### Motor Transportation of Merchandise and Passengers

By Percival White, Published 1923, by McGraw-Hill Book Company, Inc., New York, N. Y. Four hundred and eighty-six pages, 6x9 in., seventy-six illustrations, twenty-four tables, indexed.

In the preface of this new book appears the following statement: "The volume is designed to prove of practical aid and guidance to those engaged in the motor transportation business, to owners and operators of fleets of trucks and buses, to students of transportation, and finally to automotive engineers interested in the economic phases of this problem." This quotation well illustrates the purpose of the book, in the carrying out of which a wealth of valuable information, charts and statistical matter has been brought together.

A certain amount of attention has been paid to matters of construction and design, but the emphasis all the way through rests on what may be called the economic fundamentals, that is, on such matters as traffic, highways, legislation, insurance, cost accounting and operating systems.

For its general subjects, such as cost accounting, insurance and traffic, these are dealt with in relation to the broad field of motor transport. In addition the important uses of motor trucks, such as on the farm, in the factory and in municipal service, are discussed in separate chapters. For bus operators there are chapters on carrying passengers, bus transportation problems, bus construction and maintenance, and bus operation. It must not be thought, however, that these are the only matters or parts of the book of interest to bus men, as many of the fundamentals discussed for trucks or other vehicles will also be helpful to the company or individual engaged solely in the bus business.

Two high spots in the book are worth emphasizing here; the first is the necessity for a complete investigation of proposed bus operating systems. This the author compares to a merchandising study that would be made in connection with the sale of a commodity; he indicates not only in the chapters relating to buses but also elsewhere the general methods that should be followed to keep up the standard of operating practices even after the line has been started. The second is the value of railroad experience. Mr. White believes that from this form of common carrier the greatest lessons of the future for motor transportation are to be learned. The motor vehicle, the newcomer in the field of transportation, should be efficiently co-ordinated with older forms if it is to become a great public service.



# Personal Notes

## John A. Hertz, Captain of Industry

**Taxicab Magnate, Identified with Chicago Bus Interests—Extensive Plans Made for Operating and Manufacturing Units**

THE announcement made last October that John A. Hertz, president of the Yellow Cab Company, Chicago, was identified with the interests which had acquired control of the Chicago Motor Bus Company and the American Motor Bus Company presaged the dawn of a new epoch in transportation for Chicago and in the bus industry as a whole. His remarkable achievement in building up the Yellow Cab Company into an imposing place in the business world has made Mr. Hertz a national figure. Since he and his associates assumed control of the Chicago motor bus operating and manufacturing companies, changes have been made which will eventually result in Chicago having one of the finest urban transportation systems in the country as well as one of the most extensive bus manufacturing plants.

John A. Hertz is a true example of that much-abused term a self-made man. His career reads like a tale of romance, so remarkable has been his rise. Mr. Hertz, like many another leader in American industry, was born across the seas, in Austria-Hungary. When a lad of four he came to this country. Practically all of his life in America has been spent in Chicago. In that city, where he has built up a great business and where his name stands for so much today, he once sold newspapers. Mr. Hertz was successively a sporting writer, a manager of pugilists and an automobile salesman.

While connected with the Chicago sales agency of the Columbia Electric Company Mr. Hertz became interested in the transportation business. In that office was founded the forerunner of the taxicab of today, the taxi bus. During the business depression of 1907 Mr. Hertz conceived the idea of using the taxi bus for livery purposes. Although this project was successful and eventually became the well-known M. W. Shaw Corporation, Mr. Hertz was not satisfied. It is a characteristic of this man that he is never satisfied with things as they are. He is ever striving to improve them. In the lexicon of John A. Hertz there is no such word as "good enough."

Realizing the many defects in the American taxicab system of that day, he sailed for Europe to study methods and conditions abroad. While across the water, Mr. Hertz picked up many

ideas, which upon his return to Chicago were immediately put into practice. On Aug. 2, 1915, there appeared before an astonished Chicago thirty taxicabs of a brilliant orange yellow hue. This was, indeed, an innovation. Mr. Hertz had hired a chemist to make experiments in order to determine the most striking color that a taxi could be painted, and this was the result.

From that modest installation of thirty taxis seven years ago there has grown up an organization which today operates a total of 1,750 cabs, owns ten large garages and manufactures



John A. Hertz

98 per cent of all the taxicabs sold, besides controlling the extensive Chicago Motor Coach system.

A book would be needed to tell the story of the years of work and vicissitudes which intervened between the inception of the Yellow cab and the successful institution that today stands as a symbol of the business ability and progressive tendencies of John Hertz and his associates. The Yellow Cab industry, both in its operating and manufacturing units, is a success because the Hertz organization was and is forever studying new methods, adding new equipment and providing a maximum of service at a minimum of cost. Behind it all looms the indomitable figure of Mr. Hertz, the leader who, once embarked upon an enterprise, saw it through to conclusion.

In the motor bus field the Chicago system is planning non-competitive extensions of its lines to serve practically the entire city. In the manufacturing end of the business the newly formed Yellow Coach Manufacturing Company has announced an extensive program. A completely equipped manufacturing plant is now ready for operation. It

will eventually have a capacity of five buses a day. The entire output for 1923 has been sold and it is confidently expected that in 1924 the number of buses which the company will sell will about equal the combined input and sales. The company has acquired the R. & V. motor plant at Melrose, Ill., where motors will be made.

There is a saying in Chicago that John Hertz could, if necessary, raise \$50,000,000 in forty-eight hours. The \$3,750,000 stock of the Chicago Motor Coach Company was over-subscribed three times in forty-eight hours. Employees of the Yellow Cab and allied companies subscribed to \$750,000 of stock and paid for it in cash between 3 p.m. of one day and 10 a.m. of the next. Evidently the men who know Mr. Hertz best have faith in his business acumen and in the future of the motor bus enterprise under his management.

Like all really big men, Mr. Hertz is intensely human and democratic. His employees have nothing but good word for him, and with excellent reason. Mr. Hertz has consistently followed the principle of sharing profits with employees. Generous bonuses are paid the employees of the organization, based upon seniority. It is a significant fact that only rarely is an employee discharged who has been in the service more than a year.

The attitude of Mr. Hertz toward the city where he has lived since a boy and where he has seen his early ambitions fulfilled is characteristic of him. He feels that Chicago has been good to him, and as a return for the continuous patronage of the people over a long period of years, he proposes to give Chicago the finest possible transportation service. Mr. Hertz has declared that he personally did not care whether he received a dollar from the motor bus enterprise; that all the company desired was to give the stockholders a reasonable return on their investment, and that as soon as this was accomplished the fares would be reduced.

Men with the breadth of vision possessed by John Hertz are rare. In numbering him and his associates among its members, the motor bus industry has added to its prestige.

## Australia Studies U. S. Transportation

H. C. Richards, chairman of the Federal Council of Australian Motor Traders and member of the State Parliament of South Australia, is making a special trip to the United States to study modern transportation methods. This subject is of vital importance for the proper development of a country covering an area nearly as large as the United States. Last year Australia was Uncle Sam's leading motor vehicle customer, taking 11,236 cars and trucks. Mr. Richards will confer with the National Automobile Chamber of Commerce on the co-ordination of motor and rail transport.

## Thirty Years Without an Accident

Lewis H. Blair Has Enviaible Record  
of Service from Horse-Drawn Stage  
to Horseless Age.

**N**O, it isn't the title to a fairy story. It is the record made by Lewis H. Blair, Clearspring, Md., one of the pioneers in the bus business of that state. A conservative estimate of the number of passengers Mr. Blair has carried over his route between Clearspring and Hagerstown, Md., is 315,000 or ten and a half times the total population of the latter city. When he was driving a stage coach, the daily average of passengers was twenty; for the past ten years Mr. Blair has been carrying an average of sixty passengers a day.

Mr. Blair drove a stage coach over this route for years before the horseless buggy made its appearance. When the automobile was put on the market he was one of the first in the section to



Lewis H. Blair

purchase one of the new vehicles. Then people could hardly keep off the bus. Men, women and children who didn't want to go to Hagerstown, or anywhere else in particular, hopped on for a ride "just to see how it feels." They got plenty of thrills. So did the farmers along the route. These farmers had heard their grandfathers tell of watching President George Washington and members of his cabinet traveling by tallyho over that same road to Berkeley Springs, W. Va., where the first United States officials spent some of the hot summer days. But President Washington himself never attracted more attention along that old national highway than did Lewis Blair with his first motor bus! Since the first momentous trip of his twelve-passenger bus Mr. Blair has acquired three buses, the third, to be put on the road shortly, of the low-hung Pullman car type. The two buses now in operation make seven trips a day, averaging 154 miles.

During the thirty years he has been driving, Mr. Blair has traveled 552,000 miles, a distance that would have taken

him many times around the equator, with side trips to the North and South Poles. He admits that sometimes the scenery on the national highway between Clearspring and Hagerstown grows monotonous, beautiful as it is. His daily journey covers the most beautiful part of the Cumberland Valley, a section fraught with historical associations.

To three things Mr. Blair attributes his ever-increasing business: personal service to passengers, his love for children, and his reputation for having no accidents.

### CLEAR RECORD UNDER HARD CONDITIONS

Accidents are avoidable, declares the veteran bus driver. Nine out of ten of the smash-ups which occur are due to carelessness; caution and concentration are the two safeguards. By caution isn't meant a snail's pace. Mr. Blair makes the wheels whizz, but he pays such strict attention to the steering gear and the road that speed isn't made dangerous.

Mr. Blair has driven over the national highway when the road was as smooth as a sheet of glass with its coating of ice; he has waded through snowdrifts; he has piloted his bus down the mountain side when the tires were in danger because of the terrific heat of the roadbed. But he has yet to have his license card punched for his first accident. His customers feel safe when driving with Lewis Blair. That counts with brisk business men as well as timid old ladies, too!

Under the head of "personal service" Mr. Blair ceases to be a bus driver and becomes a jack of all trades.

"Lewis," calls Miss Lindy from her front porch at Clearspring one pleasant morning, "will you bring me a yard of goods like this from Hagerstown so's I can finish Sarah's dress?"

"Lewis, how about dropping this dozen of eggs for me at Mrs. Jones' there on Washington Street as you pass?" asks the village grocer. And "Lewis, will you see that Jenny gets to school all right this morning?" pleads another neighbor. Almost everyone in Clearspring calls the bus driver by his first name, for they have known him many years—ever since he was born there in 1866.

So, armed with a sample of Sarah's dress, a dozen fresh eggs for Mrs. Jones, and a pupil to be delivered at school, Mr. Blair starts out on his first morning trip. That is where the "personal service" element enters. It isn't so very much trouble for him to get that yard of goods—and having the dress finished is an important matter to Miss Lindy and Sarah and all the rest of the family.

### MR. BLAIR HAS PEOPLE'S GOOD WILL

Lewis Blair wins the good will of proud parents all along the route through their children. He gives them lifts, when he meets them on the road, and takes them novelties which he picks up in Hagerstown, and chaperons them

sometimes to a picture show in town. Lewis Blair's fondness for children extends beyond his own little brood of youngsters to all the children he knows.

Mr. Blair says he has had no "startling experiences." He doesn't call battling with snowdrifts, while a blizzard rages and his passengers wait patiently to get to their destination, a "startling experience."

Perhaps the experiences in his years of service on the road haven't been sensational or thrilling, but they have built up for him success, measured by the good will of passengers, a heavily loaded bus on every trip, and the fact that he is serving the public well. "Lewis Blair's bus" is an institution in Washington County, Maryland.

### V. E. Keenan to Run Providence Buses

Vincent E. Keenan began his duties as superintendent of the bus department of the United Electric Railways,



V. E. Keenan

Providence, R. I., on April 16. He will have charge of maintenance and operation of all the railway company's buses.

At the present time the company has seventeen buses operating over four separate routes and intends to add ten more buses to the present fleet in the near future.

For the past three years Mr. Keenan has been connected with the Fifth Avenue Coach Company, New York, in the capacity of research engineer, and previous to that he was engaged by the Locomobile Company of America at Bridgeport, Conn., being in charge of the experimental department of that company.

This experience, combined with that gained in the Tank Corps of the U. S. Ordnance Department, where he served during the World War, qualifies Mr. Keenan for the new responsibilities he has assumed.

Mr. Keenan was educated at Clason Point Military Academy, West Chester, N. Y., and at Cornell University, where he studied mechanical engineering.

# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



Market conditions  
affecting the bus  
industry.  
Price changes in  
important  
commodities.

## Dollar Gasoline Chimera

Oil Expert Points Out That Inexhaustible Supply of Motor Fuel Is Available for the Future

DR. WARREN K. LEWIS, professor of chemical engineering at the Massachusetts Institute of Technology, writing in the *Lamp* for May says that if it is assumed that the motor industry will grow during the next fifteen years at the rate it has maintained in the past ten there might be 35,000,000 automobiles in use in 1937 against 12,500,000 registered today. This might mean a possible consumption of 280,000,000 barrels of gasoline per annum as against the present consumption of 100,000,000 barrels. He then asks the question: "Has the United States sufficient petroleum reserves to meet this demand?"

According to Dr. Lewis a more hopeless subject for prognostication could not be imagined, but it is known that at the present time the production of crude oil is approaching 2,000,000 barrels per day. The next obvious inquiry is as to the yield of motor fuel which scientific methods can obtain from crude oil production. In 1922, the production of gasoline represented 29 per cent of the total crude run through the refineries in this country. Much consideration has recently been given to the problem of increasing these yields, and it has been found in a recent test by a committee of scientists and engineers that by changing the quality of the gasoline only very slightly—so slightly that the inexpert operator cannot tell the difference in the performance of his car—the yield of gasoline by straight distillation methods can be materially increased. In addition to this, by a process known as "cracking," the cheapest of all petroleum products, fuel oil, constitutes the basis for an enormous potential addition to the gasoline reserves of the future.

There was produced in the United States last year a total of 262,000,000 barrels of this fuel oil and it is estimated that without affecting the yields of kerosene, lubricants, or the specialty products of petroleum, up to 80 per cent of this fuel oil might be converted into a satisfactory gasoline if the market required that amount. This would mean that there would be available in 1937, without change in quality or decrease in quantity, or proportion of lubricants, kerosene and specialty products, almost 300,000,000 barrels of gasoline against an estimated maximum requirement of 280,000,000 barrels.

According to Dr. Lewis it is thus apparent that assuming crude oil produc-

tion to remain stationary, processes now known and used commercially for the manufacture of gasoline would enable that product to hold its own during the next generation from a supply standpoint, although it is possible that it might be to some extent supplanted by other fuels, by reason of price or cost considerations. This computation, however, completely ignores the probability that automobile engine efficiency will be noticeably increased and fuel consumption per car greatly decreased in the next ten years.

Dr. Lewis then discusses various other natural resources for the production of motor fuel not at present utilized. He says:

"Are we justified, then, in assuming that the supply of crude petroleum and the gasoline production from crude will be, on the average, sufficiently maintained to prevent either a serious shortage or an exorbitant price, while the second and third classes of natural resources have time to get into the market if they are needed? The only answer to this is the record of the past. The industry has already shown its ability to increase gasoline production from 20,000,000 barrels in 1913 to 120,000,000 in 1922, of which 100,000,000 barrels were consumed in this country. This has been done by three methods: first, by increasing crude production; second, by cutting more deeply into the crude to produce the most needed products, and, third, by cracking fuel oil.

"In this latter process the industry must in the future make some further scientific progress to the end that the maximum yield of gasoline to meet

future requirement be secured. As has been said, there remains 11,000,000 barrels of fuel oil still available for cracking each year. A factor which has already been mentioned and which operates in conformity with the varying demands for motor fuels is that the percentage of gasoline obtained from crude is far from being a fixed quantity. There can be an enormous difference in the specification and yield of gasoline, and, as has been said, the average consumer will barely notice it.

"If gasoline is relatively short, therefore, the gasoline yield on the average goes up until the balance point is reached. As gasoline piles up in storage and competition grows keener, the yield goes down and the quality gets somewhat higher. The extent of this change is seldom realized but its great stabilizing influence can scarcely be over-estimated.

"It is safe, therefore, to adopt towards this problem the same method of reasoning which the insurance actuary must use—both as to the continuance of supply from existing petroleum fields and the discovery of new fields. It is upon the average of past experience that the economies of the future rest and they promise us ample warning if the day ever dawns when a retirement to the second and third lines of defense proves necessary."

The article by Dr. Lewis was written after a study of conditions suggested by the intimation in the report of a sub-committee of the United States Senate that a price of \$1 a gallon for gasoline is a reasonable expectation of the next few years.

## Tire Heating a Problem

Manufacturers Are Trying to Meet Conditions Imposed by Buses Carrying Heavy Loads at High Speed

DURING the past few weeks it has been revealed at Akron that the tire manufacturers are seriously considering the production of new tires especially adapted for bus purposes. Tires now on the market were designed for loads as heavy as are carried in buses, but were not designed to meet the speed conditions under which the buses operate. As a result many otherwise perfectly good tires have burned up in tests made by the manufacturers before being applied to buses. The problem thus presented the industry looks upon as one which must be solved in order to give bus owners the greatest possible service.

It is, of course, well known that the heavier a tire is built and the larger the number of layers of fabric used in its construction the more easily heat is developed, while the smaller the number of layers used the greater the load that can be carried at a high speed without undue heating. For this reason the bus tire problem will probably be attacked by lightening the tire as a basic principle for developing a special bus tire.

Several manufacturers are experi-

## Gasoline Prices—May 28, 1923

City	Cents per Gal.	
	Tank Wagon	Service Station
Albany, N. Y.	21 5	23 5
Atlanta, Ga.	21	23
Boston, Mass.	20 5	23
Chicago, Ill.	20	22
Cincinnati, O.	21	23
Detroit, Mich.	21 4	23 4
Fort Worth, Tex.	20	23
Indianapolis, Ind.	20 8	22 8
Jacksonville, Fla.	19	21
Kansas City, Mo.	18 5	21 5
Louisville, Ky.	22	24
Memphis, Tenn.	17	19
Milwaukee, Wis.	20 6	23 6
Mobile, Ala.	20	22
Newark, N. J.	23	25
New Haven, Conn.	22	24
New Orleans, La.	17 5	19 5
New York, N. Y.	21 5	23 5
Oklahoma City, Okla.	16	19
Omaha, Neb.	20 5	22 5
Philadelphia, Pa.	21	24
Pittsburgh, Pa.	21	24
Richmond, Va.	22	24
St. Louis, Mo.	19 2	21 5
St. Paul, Minn.	20 7	22 7
Salt Lake City, Utah	24	26
San Francisco, Calif.	16	19
Seattle, Wash.	18	21
Spokane, Wash.	21 5	24 5
Washington, D. C.	24	26

menting with tires designed along new lines, but the experiments have not advanced to a stage where any of the manufacturers are ready to make any announcements. In fact, it is not likely that the new special bus tires will be on the market this season, but bus owners who have been experiencing difficulties because of heat development can look forward next year to new tires which will probably solve the problem.

The formation and election of officers of the new rubber manufacturers' board of trade during the month of May led to a general discussion of the automobile tire dealers' credit situation. It is generally admitted that perhaps no other field has been so fruitful of abuses by the public hurtful to the manufacturer as has the tire business.

The long datings and the long credits which are characteristic of the rubber tire business, coupled with the keen competition to obtain representation in various communities, have made rubber manufacturers easy victims for the unscrupulous. It is believed that the new organization, through co-operation, will gradually increase the efficiency of the credit departments, and decrease losses through fraudulent purchases.

### Eastern Bus Owners Seeking to Improve Riding Qualities

Sales of shock absorbers are reported to be increasing in the New York metropolitan area, Smith & Gregory, Cleveland, Ohio, distributors of the Gruss air springs, reporting among recent sales the following:

Mr. Downs, 67 Weyman Parkway, Jersey City, N. J. Lafayette-Greenville Bus Line, Clinton bus special.

William Prime, 168 Lexington Avenue, Jersey City, N. J. Jersey City-Bayonne Bus Line, Mack A. B. 2-ton bus.

E. Cavaliere, 40 Center Street, Jersey City, N. J. Lafayette-Greenville Bus Line, Sterling bus.

G. Demarest, 87 Monotor Street, Jersey City, N. J. Lafayette-Greenville Bus Line, Sterling bus.

Edward Joeham, Eighth and Provost Streets, Jersey City, N. J. Lafayette-Greenville Bus Line, Mac Car bus (2).

Leindorf Motor Sales Company, 137th Street and Madison Avenue, New York City, Concourse Bus Line, Diamond T double-deck bus.

Royal Blue Line Tours, Hotel McAlpin, Thirty-fourth Street and Broadway, New York City, Sight-seeing Bus Line, Mack A. B. bus.

J. B. Weishaupt, 128 Wayne Street, Jersey City, N. J. Lafayette-Greenville Bus Line, Sterling bus.

### Rolling Stock

Valley Transit Company, Fresno, Calif., has received two new Fageol Safety Coaches, the first of a fleet of these modern cars, which will run on the central section of the San Francisco to Los Angeles limited stage service.

General Electric Company, Schenectady, N. Y., has received an order for three trolley buses for Rochester built by the Brockway Motor Truck Corporation of Cortland, N. Y.

George L. Seidelman, formerly manager of the Auto Transit Company of San Francisco, has received a fleet of four Fageol Safety Coaches for use in Galveston and Houston.

Jefferson Highway Transportation Company, Minneapolis, Minn., has added two more Fageol Safety Coaches to its fleet of buses.

Rochester (N. Y.) Co-ordinated Bus Lines, Inc., has placed an order for five gas buses with the Brockway Motor Truck Corporation, Cortland, N. Y.

Motor Coach Company, operating a rapid transit line of buses between Redondo Beach and San Pedro, Calif., has received its first Fageol Safety Coach.

Allen's Auto Stage, El Dorado, Kan., is considering the purchase of a new bus.

Suburban Stage Lines, Kansas City, Mo., will purchase some time in June two or three additional heavy-duty passenger buses to seat eighteen to twenty-five people.

Isorial Motor Transfer Company, Kansas City, Mo., will soon purchase a small fleet of light and heavy-duty trucks.

Edward J. Dorey, operating from Binghamton to Montrose, N. Y., has purchased a sixteen-passenger bus, Transport chassis with Paterson body.

Interstate Transportation Company, running from Minneapolis to Redwood, Minn., is now operating its new Fageol Safety Coach, "Miss Redwood."

R. O. Douglass is operating a new Fageol Safety Coach from Sacramento to Folsom, Calif.

Mesaba Transportation Company, Mesaba, Mich., has just added another Fageol Safety Coach to its fleet of buses.

Sioux Falls Transportation Company, Sioux Falls, S. D., will soon place a Stoughton Sedan and two Packard buses in operation on its line.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has purchased another Mack twenty-five passenger bus for use in the Waterloo-Cedar Falls interurban traffic.

Benjamin Pizzuto, Beacon, N. Y., has purchased a new G. M. C. bus for service between Poughkeepsie and Beacon, N. Y. The body was built by the Paterson Vehicle Company and will seat twenty-six passengers.

Jamestown-Fredonia Transit Company, operating between Jamestown, Fredonia and Dunkirk, N. Y., has bought two Larabee-Deyo six-cylinder buses equipped with Whitfield bodies.

Danzelli Bus Line Company, John Danzelli, manager, which operates a bus line from Madison to Prairie du Sac, Wis., has purchased a new type Fageol twenty passenger bus to replace the one destroyed by fire a few months ago.

Public Service Railway, Newark, N. J., has placed an order for nine Hoover bodies to be installed on White Model 50 chassis. The company is building ten bodies in its own shops for service at various points in New Jersey.

San Diego Electric Railway, San Diego, Cal., has placed an order with the Fageol Motors Company, Oakland, Cal., for ten street car type Fageol Safety Coaches to be equipped with Westinghouse airbrakes, to be used for extensions and feeder service in and around San Diego.

John Fahia, Port Chester, N. Y., has purchased three new model 50 White chassis and plans to purchase bodies for these in the immediate future.

Wolverine Transit Company, Detroit, Mich., has just placed an order for five additional buses. Bodies of the twenty-one-passenger capacity manufactured by the FitzJohn-Erwin Manufacturing Company will be mounted on Ree Speed Wagon chassis.

Poconotas Transportation Company, operating the Black Diamond Line in Welch, W. Va., has recently received five new buses of the seventeen-passenger type. Bodies manufactured by the FitzJohn-Erwin Manufacturing Company, Muskegon, Mich., are mounted on Ree Speed Wagon chassis.

Youngstown & Suburban Railway, Youngstown, Ohio, has purchased four individual chair-car buses or coaches for service between Youngstown and East Palestine, and Youngstown and Salem, two 25-mile routes. These auto coaches are mounted on a Model 50 White chassis and are equipped with sixteen individual wicker upholstered chairs.

Detroit (Mich.) Motorbus Company has authorized the purchase of forty additional buses to take care of increased traffic.

Long Beach Railway, Long Beach, L. I., N. Y., has purchased six twenty-five-passenger Reos for service on its rail line. These are fitted with Paterson bodies. They are being delivered from the body factory to the operators, over the highways, after which they will be rebuilt and fitted with cowcatchers and steel-tired wheels.

### Business Notes

McKay Carriage Company, Grove City, Pa., bus body manufacturer, has completed a \$50,000 addition to its plant. The new addition, a steel and cement building, will be used exclusively for the manufacture of the company's new sedan-type bus bodies.

Superior Motor Coach Body Company, Lima, Ohio, has been formed for the exclusive manufacture of modern motor coach bodies. The company has taken over a newly completed modern factory at Lima, Ohio, and is ready to start production. Officers of the new company are: President, Emmett R. Curtin, Sr.; vice-president, R. J. Plate; secretary-treasurer, H. P. Dean.

R. F. Ney has been appointed manager in charge of sales and service of the new division of bus equipment and supplies of the Transit Equipment Company, New York, N. Y., and is assisting young men anxious to enter this field of transportation in securing franchises, etc. Many new routes in upper New York state and New Jersey are being opened up through Mr. Ney's efforts.

Franklin Machine & Tool Company, Springfield, Mass., has been consolidated with the Van Norman Machine Tool Company of that city, under the name of the latter organization. The personnel of the Franklin Machine & Tool Company will be retained in the new organization and no change will be made in sales policies or design of what were formerly Franklin tools. The merger is a distinct step forward for both companies and enables the Van Norman Machine Tool Company to offer a complete line of valve and piston grinding machines.

Burton W. Collins, who has been connected with the automotive industry for a great many years, with such firms as the Lozier Motor Company and the Springfield Metal Body Company, has now become associated with Charles S. Monson, manufacturers' representative, as Eastern representative. In this connection he will cover the passenger car, truck, tractor and engine building lines of the industry. He will make his headquarters at the Karson Manufacturing Company, Long Island City, N. Y. Charles S. Monson has recently taken over the lines of the Karson company as its general sales representative.

Eaton Axle & Spring Company, Cleveland, Ohio, has announced that the following companies will combine under one ownership. The properties and organizations of the Eaton Axle Company, the Torsen Axle Company and the Perfection Spring Company. The financial resources and the manufacturing facilities of the new company will enable it to meet every axle and spring requirement of the automotive industry. The men who have long built and marketed the products of the respective plants continue in active charge of the operations for the new company. The organization is as follows: J. O. Easton, president; Dan C. Swander, vice-president and general manager of the spring division; C. L. Ochs, vice-president and general manager of the axle division; R. C. Enos, vice-president and director of sales; E. A. Buchda, treasurer.

### Advertising Literature

Reo Motor Car Company, Lansing, Mich., has printed a sixty-four page booklet entitled "Reasons for Reo." This describes and illustrates the various departments of the factory.

Hoover Wagon Company, York, Pa., has printed a twenty-four page booklet describing and illustrating Hoover bus equipment, which consists mainly of bodies designed for mounting on any type chassis.

National Automobile Chamber of Commerce, New York, N. Y., has issued the 1923 edition of "Facts and Figures of the Automobile Industry." As the name indicates, this booklet gives figures regarding production and application of motor vehicles in various cities, states and countries. It also contains a great deal of valuable information relating to highway conditions and to legislation governing motor vehicles.

Austin Company, Cleveland, Ohio, engineers and builders, has issued an eight-page booklet, entitled "Multi-Story or Single Story—Which?" devoted to a comparison of the relative merits of multi-story and single-story buildings. The construction costs, relative operating costs, as well as the general factors which influence the ultimate cost of factory building, are discussed.



# BUS TRANSPORTATION



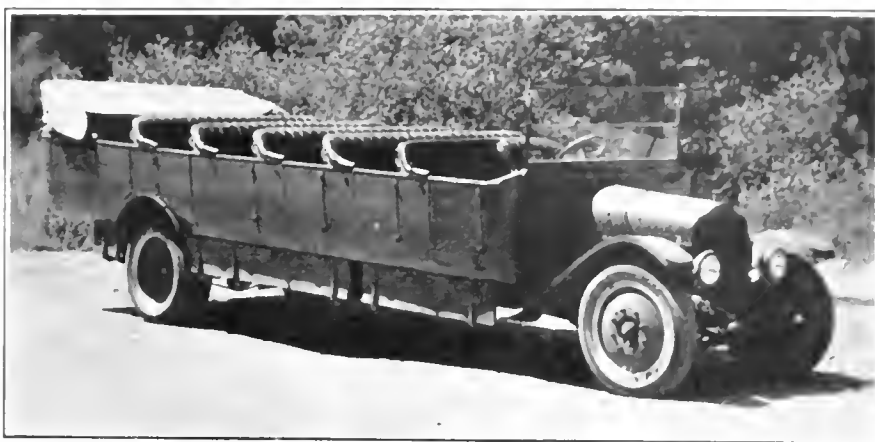
New York, July, 1923

## Maintaining Dependable Service on Heavy Grades and Rough Roads

**T**HE Yosemite Transportation System is notable among Western stage operations for several reasons: Almost the entire length of the 400 miles of mountain roads traversed presents unusual operating conditions. All-year-round service can be maintained on only about 35 miles of the system. For five to six months the roads leading out of and those beyond the Yosemite Valley are blocked by snow. A large part of the longest run is at elevations of more than 7,000 ft., with one pass 9,940 ft. high; most of the mileage is on long steep grades, and the road surface is rough and rocky.

Under these conditions dependable service can be maintained only with suitable equipment carefully kept up to highest efficiency and handled by skillful drivers. Recognizing these needs as imperative, a system of inspection and upkeep has been developed suited to the high maintenance standards required. How successful this has been is indicated by the fact that last season, when the company operated 261,000 vehicle-miles carrying a total of 121,000 passengers, the delay en route due to failure of equipment totaled only forty-seven and a half hours.

The system includes three main routes centering in Yosemite Valley and extending to the Hetch Hetchy Valley, the Mariposa Grove of Big Trees, Glacier Point and Lake Tahoe. In 1922 Yosemite National Park was visited by more than 100,000 tourists—a number exceeding that recorded at any other national park. Although the valley is accessible all year round by the railroad that follows the Merced River, there is no automobile road via this route and as the two roads into the valley go over 8,000 and 7,300 ft. elevations respec-



*Type of car used to bring trainloads of tourists from railroad terminal into Yosemite Valley*

tively, automobile travel is limited to the open season. The Yosemite Transportation System, however, keeps stages in the valley all winter and operates on a winter schedule over some 35 miles of road on the floor of the valley, and between the valley and the railroad terminal at El Portal, the entrance to the park. On this latter run enormous peak loads are imposed on the system in the summer time. Trains regularly

come in in two sections, each section delivering 250 passengers who expect to go immediately to the Yosemite Valley.

From the Yosemite Valley to Lake Tahoe the distance is 250 miles over the scenic Tioga road. This run taxes the mechanical equipment the most because of the greater mileage covered and the heavier grades. The Kingsbury grade on the north end of this run has an average of 26 per cent for 3 miles, with a maximum of 28 per cent. On the Mariposa Grove route a 2-mile grade averages 14 per cent and on the Hetch Hetchy run the first 3 miles average 12 per cent. With the exception of a single mile of pavement in the valley, none of the routes traversed is paved, and except for the floor of the valley the mileage is all on typical mountain roads. The rolling stock used in this service is listed in the table at top of page 316.

The company uses White chassis exclusively and builds the bodies in its San Francisco shops, to suit the mountain requirements. All cars

**The Yosemite Transportation System Operates on 400 Miles of Mountain Roads with Grades Up to 28 per Cent. Overhauling Is Done in Winter as Every Car Is Required During Summer Peaks. Tire Costs Less than 1 Cent per Tire Mile. Brake Adjustments Made Daily. Novelties in Design Include Folding Running Board, Housed Spare Tire, and Convertible Front Seat**



Number of Cars	Type	Passenger Capacity	Run
4	Model 50 White chassis.....	27 (a)	Yosemite Valley only
14	Model 15-45 White chassis.....	14 (b)	All runs
8	Model 15-45 White chassis.....	18	All runs
2	Model 15-45 White chassis.....	10	All runs
5	Model 15-45 White chassis.....	6	All runs
2	5-ton truck chassis (c) with removable bodies	33	Yosemite Valley only
2	5-ton truck chassis (c) with removable bodies	2	Service cars

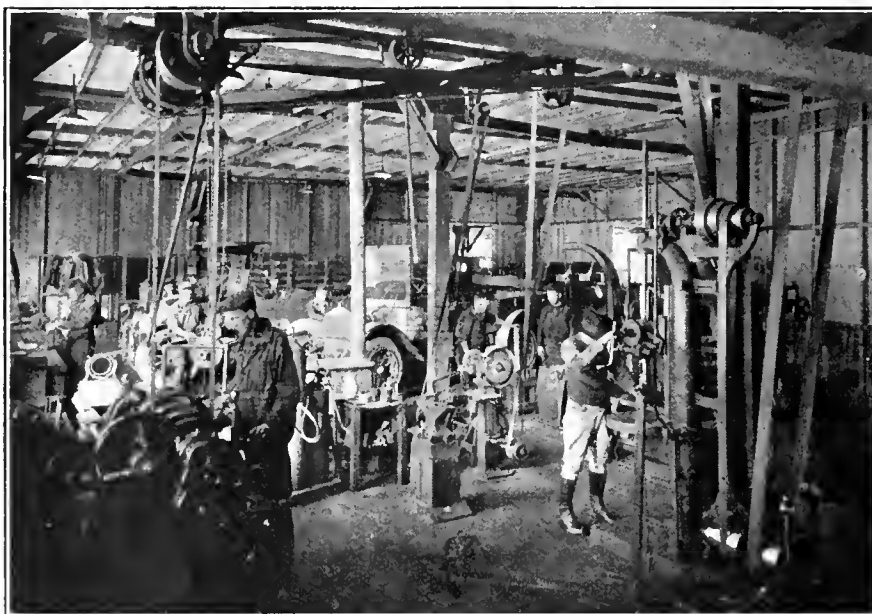
(a) Twenty-five passengers if removable front seat is taken out to provide space for baggage.

(b) Twelve passengers if removable front seat is taken out to provide space for baggage.

(c) These cars used for passenger service only to serve excursion trains.

have their tops down more than 90 per cent of the time they are in service, but carry a folding top on the mountain runs. The tops are kept down because patrons of the system make the trip primarily to see the mountain scenery; traveling at low speed, as they must, protection from the wind is not necessary. The tops cannot be left off, on the other

The stage bodies are all made with parallel sides. There is no taper to a narrower width at the forward end to give graceful lines; the objective in design being rather to give maximum comfort and seating capacity. The maximum width consistent with the design of each car has been used for all seats. Because of the narrow roads the projection



*Machine shop of the Yosemite Transportation System*

hand, because occasionally mountain storms accompanied by torrential downpours come up very suddenly.

At first the ordinary type of folding top was used, but owing to the constant bouncing over rough roads the creases in the folded fabric wore through in a single season. Now the bows of the top are folded back and incased in a cover as before, but the waterproof fabric of the top is never folded; it is attached to the bows by Murphy fasteners and when not in use is taken off and rolled up, in which form it can be carried indefinitely without damage. The material used for these tops is an English burbank, worth, wholesale, about \$3.50 per yard. Two men can ordinarily put up the bows and button the top on one of the fourteen-passenger cars in about eight minutes.

of running boards was found undesirable and these now fold up.

The twenty-seven-passenger cars are used to convey the tourists, as they arrive by trainload at El Portal, the railroad terminus, to the Yosemite Valley hotels, lodges and camps, which are all about 15 miles distant. When the travel is heaviest and all seats are needed for passengers the baggage is brought up from the railroad station by truck. Baggage can also be carried in these cars at front and rear. A closed compartment under the rear seat is accessible by doors in the rear end of the body. At the front, when not required for the use of passengers, a two-passenger upholstered seat beside the driver can be lifted out, leaving a roomy space for hand baggage. A cover is fitted over this space to protect the baggage from dust.

On some of the cars the spare tire is carried inclosed in the body beside the driver. This gives the vehicle a much better appearance, the tire is always protected from the weather and is clean when needed.

The maintenance and repair work of the system is done entirely in the main shop in Yosemite Valley. The shop has been thoroughly equipped because work that cannot be handled there has to be sent to San Francisco, which entails the loss of two days time in making the round trip. The policy of the company has been to keep the cars up to such a standard of mechanical efficiency that no overhauling is necessary during the four-month summer season when traffic is at its peak. During this time every car of the system is required to handle the business. Surplus equipment is undesirable because of the loss in interest on the investment during the winter months when most of them are not used.

Overhauling, therefore, is thoroughly done on all of the cars during the winter, and in the summer season it is expected that the shop will turn out all ordinary repair jobs between runs. One motor, one transmission and one rear end are kept on hand as spares, and these are substituted when required between runs. Thus far the fleet has been maintained practically without holdout.

In the past two years the only car towed in was one that had been badly damaged in a wreck. Sometimes the cars that develop trouble on the road are unable to complete the run, but with the one exception noted, when mechanic and service car were sent out, the car in trouble has always been driven in to the central shop. Last summer there were reported forty-two cases of mechanical trouble on the road. These were classified and tabulated by routes, by parts, and by cars, so as to facilitate a study of weaknesses in equipment and sources of road trouble. Two of the tabulations were as follows:

#### Percentage of the Various Kinds of Trouble

Broken axles.....	11.9
Ignition.....	16.6
Carburetor.....	4.7
Rear end.....	11.9
Clutch.....	2.3
Gasoline line.....	4.7
Front wheel bearings.....	7.1
Connecting rod.....	4.7
Cracked motor block.....	2.3
Vacuum tank.....	4.7
Rear wheel.....	2.3
Springs.....	14.3
Gearshift.....	2.3
Transmission bearing.....	2.3
Tire trouble.....	4.7
Collision.....	2.3



Percentage of Total Car Mileage Versus  
Trouble Percentage

	Mileage	Trouble
Six-passenger cars	30.6	16.6
Ten-passenger cars	11.8	23.8
Fourteen-passenger cars	36.0	43.0
Eighteen-passenger cars	9.2	7.1
Eighteen-passenger cars (old)	4.7	2.3
Moreland	0.9	7.1
Twenty-seven-passenger cars	7.6	0.0

During the summer months practically all the inspection and maintenance work has to be done at night. The shop organization consists of one night foreman, one inspector, four mechanics, three greasers, and four washers.

As a car comes in the driver files a written report of its condition, noting any work that he thinks needs to be done. It is to be noted that usually a driver specifies attention of some sort after bringing a car in from the mountain divisions. All cars are washed every night and this operation is performed first, after which inspection can be made to better advantage. The inspector goes over each car carefully and confers with the night foreman on any special work required.

After seven days of operation each car gets a detailed inspection by a mechanic who is assigned to take such time as is necessary to go over the car, item by item, tightening bolts and checking up on its mechanical condition. The time of greasers and washers is charged to all cars—that is, no attempt is made to segregate the greasing and washing charge to each individual car, this item rather being a proportion of the total charge for this service. Under the conditions on this system it is believed that the bookkeeping entailed by segregating the records would exceed its value.

In order that windshields may be freshly cleaned as a car leaves the garage, this duty has been assigned to the driver taking out the car. To make it impossible for him to evade it the man who washes the car is



Type of car used on mountain divisions. Note the body lines designed for comfort, and the compartment for a spare tire.

instructed to go over the windshield with Bon Ami, leaving the white deposit on the glass. Thus the windshield is not serviceable until the driver cleans it off in the morning.

## SHOP PRACTICE FOR BRAKES

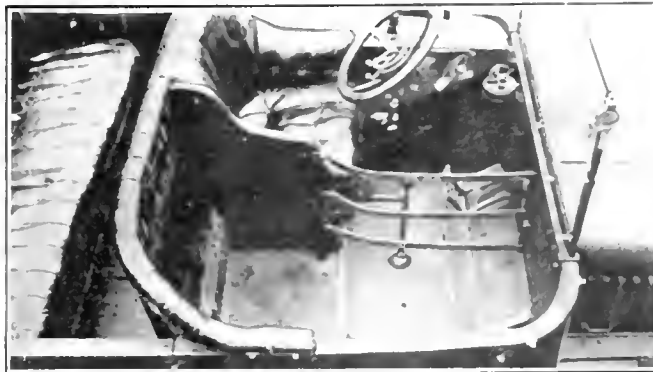
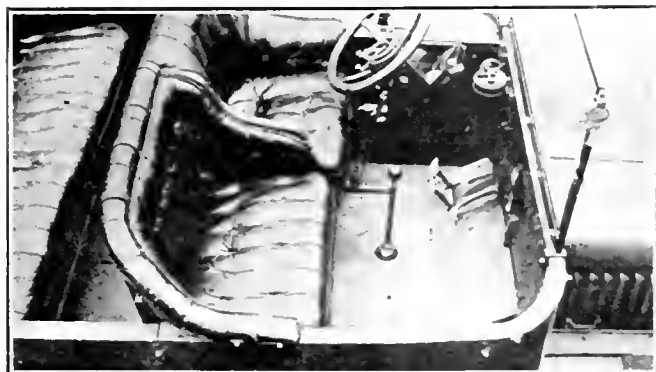
Brake maintenance is one of the important and expensive items of regular shop work. The fourteen-passenger cars, which are used chiefly on the mountain runs, make an average of 10,000 miles per season and require that the service brake linings be renewed about every 1,500 miles. These cars usually travel down the long grades in second gear, which requires the use of a brake in addition to the retarding effect of the engine. Relining the hand-brake bands on the inside of the rear drums is usually done once a month, or every 2,500 miles. Various kinds of brake lining have been tried. The

molded type has been abandoned as not satisfactory. A woven lining is now being used as the most satisfactory kind found to date.

Careful inspection and adjustment of the brakes is made every night. This is done by jacking up both rear wheels and using a feeler gage around the brake to determine clearances. When high spots are found which, however, do not warrant changing the lining, it is customary to put the car on the washrack, jack up the rear wheels, and with the brakes set, run the engine long enough to wear down the high spots. During this process a stream of water is turned on the drums to keep them from over-heating.

In order to get satisfactory adjustment of brakes for service in the mountain divisions special consideration has to be given to three factors: (1) When loaded these cars weigh about 8,200 lb.; (2) owing to the rough roads spring deflections have a marked effect on the brakes by making brake rods longer or shorter as the body of the car goes

*The view at the left shows space for two passengers beside the driver. At the right, the seat has been removed and space provided for baggage.*



YOSEMITE TRANSPORTATION SYSTEM MAINTENANCE DIVISION																												
Car No. ....										Car No. ....										Car No. ....								
Month .....										Month .....										Month .....								
Date	A	B	C	D	E	F	Miles Run	A	B	C	D	E	F	Miles Run	A	B	C	D	E	F	Miles Run							
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YOSEMITE NATIONAL PARK CO. TIRE CHANGE BLANK									
SPEEDOMETER READING					TIRE ON				
WHEEL					WHEEL				
TIRE NO.					TIRE NO.				
REASON					TIRE TAKEN FROM				
REPAIRS					STOCK ROOM				
BLOW OUT					REPAIR BACK				
PUNCTURE					TRUCK OR CAR NO.				
ADJUSTMENT					WHEEL				
DATE					CHANGED BY				

LEGEND			
A-Grease, 100 Miles.	C-Fill Oil, 500 Miles.	E-Change Oil, 1000 Miles	
B-Grease, 500 Miles.	D-Change Oil, 500 Miles.	F-Water, 7 Days.	

Maintenance forms used by California bus operator. Tire change blank also used by drivers

up and down; (3) brake linings will swell excessively due to the heat generated by constant use in coming down grades several miles long. Because of this swelling, unless the adjustment is made so that the band grips the drum uniformly all the way around, the tendency to overheat and swell still more is greatly increased.

Brakes are adjusted so that they are fairly free or loose when the cars leave the shop. On the long grades drivers are instructed to use their brakes alternately; that is, first the foot brake and then the emergency brake. By thus alternating, the heat on any one brake is kept down to a minimum.

This year the company is trying out a hydraulic brake on a Model 50

White chassis. This comes equipped with an internal emergency brake on the rear wheels, and a service brake on the driveshaft. An external service brake has been put on the rear wheel drums of this experimental vehicle and both the driveshaft brake and the external brake on the rear wheel have been connected hydraulically to the foot-brake pedal. The foot-brake pedal will thus operate both the driveshaft and the external rear-wheel brakes. The driveshaft brake has one cylinder and the rear-wheel brake two cylinders; one cylinder to each wheel. In designing this brake, the rear axle gear ratio was a factor, as the brake is so designed that equal braking pressure will apply on both sets of brakes.

A standard size of 36 x 6-in. tires

is used front and rear on nearly all stages operated by this company. Where the larger stages would give excessive pressures on single tires, dual rear tires are used. Every year one make of tires is used exclusively, except that two cars are equipped with tires of different makes, which are used as an experiment and a guide in buying next year's tires. Very little difference has been found in the standard makes of tires.

The standard tire pressure is 100 lb. in the rear and 90 lb. in front. The average mileage is about 5,500 on the mountain runs for the rear tires having non-skid treads, with

### More Important Equipment Necessary for Stage Maintenance, Yosemite Garage

LeBlond Lathe, 20-in. heavy-duty quick-change, equipped with taper attachment and milling and universal grinding attachment.  
Power drill presses (two)—power emery grinder.  
Power hack-saw—Arbor presses (two).  
Acetylene welding outfit—Complete blacksmith shop.  
Motor, transmission and rear axle assembly stands.  
Red devil jacks—Electric valve grinder—power air hammer.  
Special attachment on lathe for boring and reaming connecting rod bearings.  
Special reamers for main bearings. (Very little hand scraping is done on bearings, as they are all bored and then reamed.)  
Weber crank retuning tool.  
Special jig for lining and squaring connecting rods and pistons.  
Brake relining machine.  
Oakite parts cleaning tank, electrically heated.  
Upholstering department in charge of a competent upholsterer.  
Paint shop in charge of a competent painter.  
Well equipped stockroom.

perhaps as much as 1,000 miles more on tires used in front. Last season the average tire cost was between  $\frac{3}{4}$  and 1 cent per tire mile run. The no-adjustment plan was followed in purchasing tires for the present season and by this plan they were somewhat cheaper. This year the tire cost is expected to be kept under  $\frac{3}{4}$  cent per tire-mile.

An important difference noted in treads is due to the rough roads on which the tires are continuously used. Ribbed tires give about 1,000 miles more than non-skid treads. This is ascribed to the fact that the tendency to spin, due to the spring release when traversing rough spots, tears off the buttons of the non-skid treads. The non-skid feature, on the other hand, has no advantage when the road is slippery; chains have to be used regardless of the kind of tread. The manufacture of 6-in. ribbed tires has been practically discontinued, because of the popular demand for non-skid treads. Arrangement has therefore been made with the Goodyear Tire Company to make

special molds for manufacturing these tires.

Tire inspections are made every night by the "tire man" at the Yosemite shop and new tires are put on whenever, in his opinion, further use of a worn casing would be likely to give trouble on the road. Retreading is not considered economical and when a tire is taken out of service it is sold for scrap.

If a driver makes a tire change on the road, he fills in on the tire change card he carries the date, time of day, and the number of the line the car was operated on. From this information the tire man gets the mileage the tire made that day. All tires are branded with a number and a card index is kept of each individual tire. Each day the mileage a car runs is entered on a daily operating sheet, and every month this mileage is entered on the tire cards. Whenever a tire is shifted from its original position or car, it is immediately entered on the tire card, and in this way an accurate check is kept on the mileage. Tires are tested and inflated to the proper pressure each night. This work is assigned to the men greasing the car. After they finish greasing the tires are tested and pumped up if necessary.

Tire changes on the road are very infrequent; last season there were less than half a dozen due to worn-out tires or blowouts. Operating on a flat tire is sufficient ground for the dismissal of a driver, except on the sections of the road where the National Park Service maintains "control," that is, where traffic is allowed in one direction only for a limited time and then in the reverse direction for the same time, a maximum and minimum time limit being set on the passage of each vehicle between control points. However, last season only three tires all told were lost due to being run flat.

Because of the infrequency of road changes and the fact that the stages nearly always operate in strings, it has been found sufficient for each car to carry only one spare. The cars do not carry speedometers. The lengths of all runs, of course, are known and as there is no opportunity for deviation or detouring, the mileage of each day's run is entered nightly in the records in accord with the run to which the car was assigned.

Material for this article was supplied by J. Rieschel, operating manager Yosemite Transportation System.



*The company's monogram is the only exterior decoration*

## New Coaches for Youngstown & Suburban Railway Have Individual Wicker Chairs

**Luxurious Vehicles Will Supplement the Regular Trolley Schedule to Salem and Also Serve East Palestine, Where the Railway Does Not Operate**

IN APRIL, 1923, the Youngstown & Suburban Railway, Day & Zimmermann, Inc., Management, began bus operation between Youngstown and Salem. The route was, in general, parallel to the company's own tracks. The bus line, however, serves several localities more or less remote from the railway, and it is thought that the transportation needs of these places justify the establishment of the new service. In fact, a group of wildcat jitneys were already attempting to do this business before the company commenced operation.

Service was started by the use of touring cars during the period of

construction of the permanent vehicles. Of these the first was delivered in May and four will be used ultimately. The design of the new coach has been based on the theory that the coach service to augment the railway service should appeal to the psychology of the automobile owner and strive to recover not only the present bus business but also much of the private automobile travel that was lost ten years ago. In the same way that the interurban freight business has been built up on the theory of "express service at freight rates," it is the hope of the management that the coach service will be built up



*The chairs may be moved about to suit the passengers' convenience*

on the theory of "Pullman service at day-coach rates."

A twenty-nine-seat body shell is used, although the actual seating capacity is only sixteen. There are eight individual wicker chairs, two double seats over the wheel housings and a settee across the rear divided into four sections. All the seats have comfortable rounded arm rests and soft green plush cushions. The individual chairs can be moved around to suit the pleasure of the passenger, although they are fastened to the floor by a special swivel attachment which prevents their being placed too far out in the aisle. The movable feature of the chairs adds greatly to the convenience of passengers carrying hand baggage. A bucket seat upholstered in green leather is provided for the driver.

Dark green battleship linoleum covers the entire floor, and down the center is laid a strip of green carpet of the same color as the chair cushions. Rubber casings are used on all chair legs to prevent slipping and injury to the floor covering. Rex silk finish curtains are provided for the windows. The artificial lighting is from side bracket lamps.

#### UNUSUAL HEADROOM IS PROVIDED IN THE NEW COACHES

An attractive feature of the interior design is the headroom provided, there being a full 6-ft. clearance. This immediately allows the use of a "pay enter" or single service door type of vehicle rather than the multiple door vehicle limousine type. It is believed that the elimination of the multiple doors has certain advantage in many-stop service.

The scheme of decoration is mahogany, Nile green, and eggshell white. The woodwork and side panels are solid African mahogany with a rubbed velvet finish, the seat cushions and backs Nile green plush, the wicker work finished a mahogany to match the side walls, and ceiling enameled the eggshell white. Plate-glass windows add much to the appearance from both the interior and exterior.

Pullman green, the same color as is used in painting the company's railway cars, is used for the exterior of the new buses. There is no striping nor trimming on the outside, except the monogram of the company. The body was built by the Kuhlman Company and is mounted on a Model 50 White bus chassis. The extreme width is 6 ft. 11 in., the

over-all height is 9½ ft., and the length of chassis is 250 in. A manually-operated two-leaf door at the front opens outward, and the emergency door is at the left rear.

Four buses of this type will be used, operating through between Salem and Youngstown on a two-hour headway during the greater part of the day. The railway gives hourly service to Salem, and the bus schedule is arranged to split every second trolley headway.

The fare charged is based on 3½ cents a mile and is slightly higher than the electric cars and considerably higher than the competing jitneys.

In the evening, the buses will not operate through to Youngstown but will meet cars at Columbiana and carry passengers from there to East Palestine. The jitneys which are competing with the company formerly provided the service between these two points, unloading their passengers at Columbiana for transfer to the railway. It was when they commenced to run through to Youngstown that the railway first took up bus operation. From the favorable comment aroused by the first appearance of the new buses with individual wicker chairs it appears likely that they will jump into immediate popularity.

#### Analysis of Bus Transportation Field—Number of Buses Compared with Population and Highway Mileage—(Figures in Right-Hand Column Used in Map on Opposite Page.)

Group	State	Population (United States Census, 1920)	Mileage Federal-Aid Highways	Number of Estimated Buses	
				City	Into- City
New England	Maine	768,014	1,326	120	2,250
	New Hampshire	443,083	1,000	100	1,180
	Vermont	352,428	1,043	0	1,230
	Massachusetts	3,852,356	1,290	2,430	4,570
	Rhode Island	604,397	165	380	700
	Connecticut	1,380,631	820	680	2,340
Middle Atlantic	New York	10,385,227	4,554	7,210	9,900
	New Jersey	3,155,900	1,198	1,720	4,750
	Pennsylvania	8,720,017	6,300	3,360	18,200
East North Central	Ohio	5,759,394	4,005	2,580	10,700
	Indiana	2,930,390	4,966	830	7,220
	Illinois	6,485,280	6,739	3,230	10,830
	Michigan	3,668,412	5,250	1,630	6,860
	Wisconsin	2,632,067	5,516	720	6,570
	Minnesota	2,387,125	7,213	680	5,870
West North Central	Iowa	2,404,021	7,144	390	7,000
	Missouri	3,404,055	7,806	1,190	7,580
	North Dakota	646,872	4,815	0	2,270
	South Dakota	636,547	8,077	20	2,150
	Nebraska	1,296,372	5,619	230	3,680
	Kansas	1,769,257	6,600	210	5,430
South Atlantic	Delaware	223,003	266	100	400
	Maryland	1,449,661	1,036	750	2,300
	District of Columbia	437,571	0	410	0
	Virginia	2,309,187	3,733	460	6,380
	West Virginia	1,463,701	1,710	160	4,530
	North Carolina	2,559,123	4,194	150	8,430
	South Carolina	1,683,724	3,225	100	5,550
	Georgia	2,895,832	5,662	400	8,680
East South Central	Florida	968,470	2,960	190	2,680
	Kentucky	2,416,630	3,250	350	7,190
	Tennessee	2,337,885	4,077	400	6,750
	Alabama	2,348,174	3,958	270	5,900
	Mississippi	1,790,618	3,299	0	6,290
	Arkansas	1,752,204	5,037	90	5,830
West South Central	Louisiana	1,798,509	2,800	410	4,800
	Oklahoma	2,028,283	7,889	180	6,440
	Texas	4,663,228	10,655	800	12,700
	Montana	548,889	4,700	40	1,780
Mountain	Idaho	431,886	2,772	0	1,520
	Wyoming	194,402	3,234	0	680
	Colorado	939,629	3,360	310	2,140
	New Mexico	360,350	3,257	0	1,260
	Arizona	334,162	1,498	30	1,070
	Utah	449,396	1,655	140	1,050
	Nevada	77,407	1,524	0	270
Pacific	Washington	1,356,621	2,970	540	2,760
	Oregon	783,389	2,805	250	1,840
	California	3,426,861	4,447	1,680	5,880

Group Totals					
Northeastern	7,400,909	5,644	3,710	12,270	15,980
Middle Atlantic	22,261,144	12,052	12,290	32,850	45,140
East North Central	21,475,543	26,476	8,990	42,180	51,170
West North Central	12,544,249	47,274	2,720	33,980	36,700
South Atlantic	13,990,272	22,786	2,720	38,950	41,670
East South Central	8,893,307	14,584	1,020	26,130	27,150
West South Central	10,242,224	26,381	1,480	29,770	31,250
Mountain	3,336,101	22,000	520	9,770	10,290
Pacific	5,566,871	10,222	2,470	10,480	12,950
Grand Total	105,710,620	187,419	35,926	236,380	272,300

# Green Fields for Bus Transportation

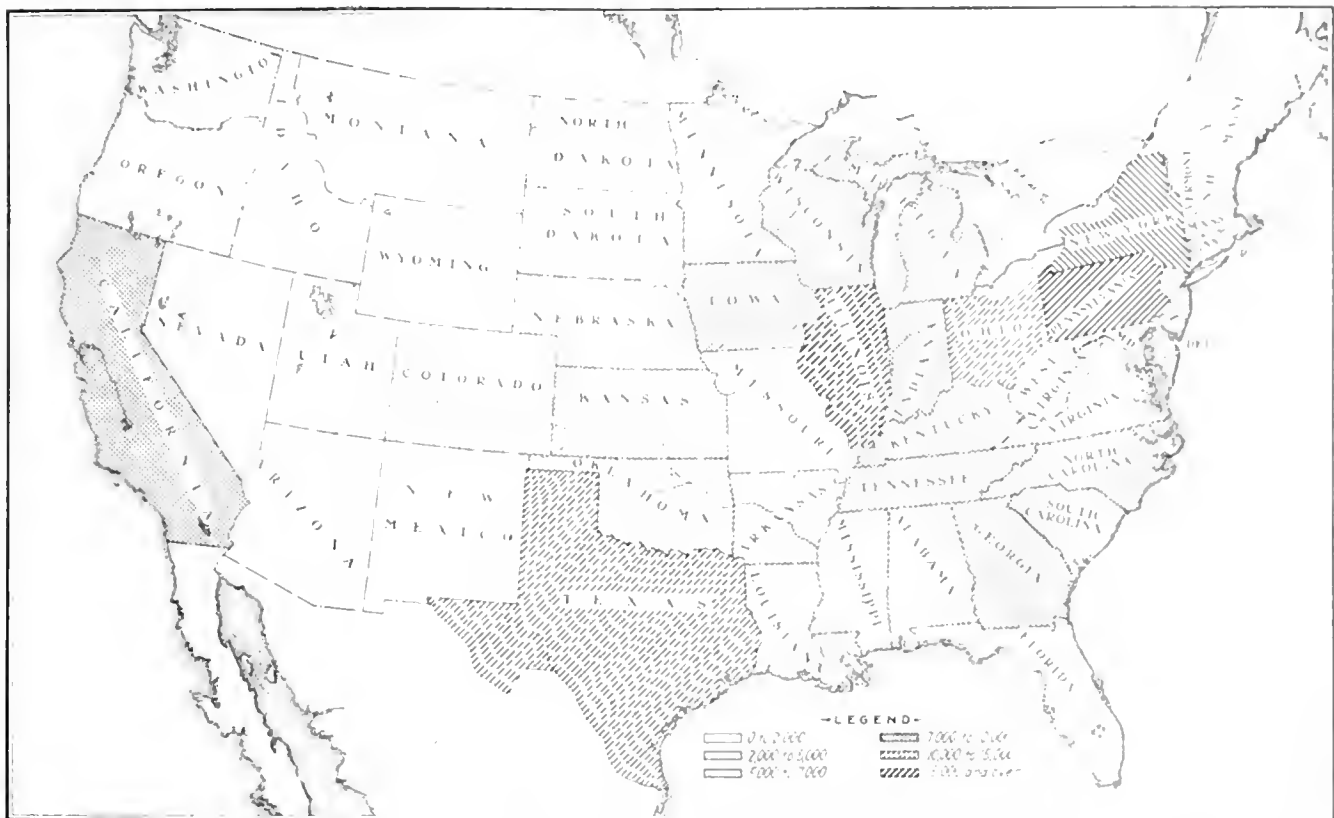
Another Billion Dollar Industry Approaching—  
Highways and People Are Ready—  
More Real Operators and Real Buses Needed.

**A**LL over the United States are places where the bus should be used—green fields in the shape of fertile and attractive territories. We already have thousands of miles of improved highways, with a wonderful federal-aid system well under way, and with the greater part of our people living near enough so

ness, which for the moment may seem somewhat large, two classes of bus operation have been considered: city and "into-city." The first, city operation, is taken to cover local bus lines in places of 25,000 and upward, on short routes, making frequent runs, through dense traffic. On this basis of population city lines will

serve seven million people, or almost two-thirds the people in the country.

We can conservatively assume a riding habit of 100, as measured in rides per year for each person. That is, as the basis of calculation we can fairly say that sufficient bus service is needed to give every man, woman and child 100 rides each year.



that they can make frequent use of any regular system of transportation provided on these highways.

Most people appreciate the fact that bus transportation as an industry has a most active present and an even livelier future. They seldom, however, have any definite measure of its possibilities, and for that reason BUS TRANSPORTATION has made some estimates of the present field. These show that we have another billion dollar industry approaching, as estimated by the cost of the service that even now could be provided by the bus.

In getting at this amount of busi-

*Density of bus operation in the United States, based on estimate of 272,000 buses in service. Details in table on opposite page.*

ness serve approximately thirty-eight million customers.

The other class (into-city) includes all bus lines running into rural territory, with terminals, or at least one of them, in good-sized towns or cities. On these lines the routes are comparatively long, headways are infrequent and service is given to thinly-settled districts. But in spite of this, the into-city routes have as their market some sixty-

It is believed that this figure will apply fairly enough for both the city and into-city operations. In many cities the electric systems have a business of 300 or 400 rides per capita annually, so that counting supplementary new routes, as well as feeder systems, the bus lines can get the amount of business assumed, without encroaching on the functions of the street cars. In the rural service, on the other hand, the bus will frequently be the only means of transportation, so that one round trip a week, which is all 100 trips a year means, for each person seems reasonable.

To figure the number of buses required for this service, we will proceed on the basis of sixteen passenger bus units; it will be recognized, of course, that in many operations double-decker or larger single-decker vehicles will be required, while still others will use vehicles of only six, eight or ten-passenger capacity. However, the sixteen passenger is the fair average size, as shown by the statistical tables that are published regularly in BUS TRANSPORTATION. We will say further that the city vehicle makes twenty-four one-way trips a day, and the country vehicle six one-way trips a day, each carrying twelve passengers on the average, or three-quarters the seating capacity.

We can now calculate the number of buses required for the service. For example, the state of Maine has about 127,000 people in places of 25,000 or more population. For these about 120 buses would be required. Outside of this city territory there are about 641,000 people in the state. Many of these are at a considerable distance from the improved highways, however, so that only three-quarters of the small-town and rural population are used in getting the number of buses required for "into-city" service. (Secretary of Agriculture Henry Wallace in a recent address showed that on the federal-aid system, which of course is only a small part of the improved highway mileage, more than 95 per cent of the people of many states would live within 10 miles of federal-aid roads, while even in Arizona only about one-third would live outside the 10-mile zone). On this basis the state of Maine would require 120 buses for city service and 2,250 for "into-city work," or the 2,370 shown in the table on page 320.

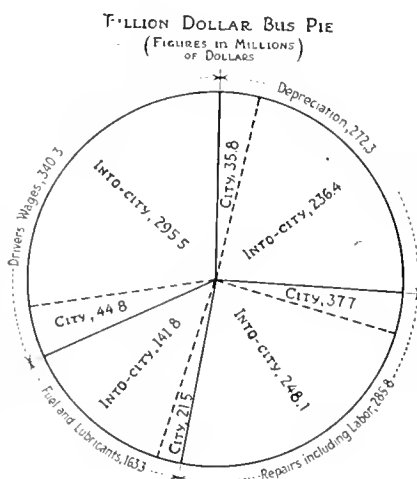
The figures for each state have been worked out on the same basis. For reference purposes, the population and the federal-aid highway mileage are also given. This mileage, of course, does not represent the bus operating "right-of-way," since there are already some 350,000 miles of improved highway in the country. The national system, however, will undoubtedly include the most important and densely-settled highways, and so most of the buses.

The grand total shows a field for some 272,000 buses, of which 36,000 will be used in the cities and the remainder, 236,000, in the "into-city" class of operation.

At \$3,000 apiece these vehicles would represent a cost of some \$816,000,000 alone, a figure in itself approaching the billion dollar mark. However, in order to measure the size of the industry we must measure the amount spent each year, which can be tabulated as follows:

Charge against vehicles (three-year life) .....	\$272,300,000
Repair and labor costs .....	285,800,000
Fuel and lubricants .....	163,300,000
Drivers' wages .....	340,300,000
Total .....	\$1,061,700,000

This shows, rather roughly, of course, since only the more important items are considered, the total volume of the business. The second figure, repair and labor costs, is based on 35 per cent of the first cost of the vehicle, the fuel and lubricants on 20 per cent of the first cost, while the drivers' wages are



*A billion dollar bus "pie" showing estimated distribution of important expenses as between city and "into-city" operation*

figured on \$25 a week for fifty weeks a year. These figures are shown graphically in the billion-dollar "pie," which gives also the proportion of each item for city and into-city operation.

It has been said that there is a field now for this billion-dollar bus transportation industry. Just when it will come into existence will depend on the progress made both by the bus operators and by the makers of buses, as reflected in their product. It is not to be supposed that an installation, which from the present point of view seems enormous, although it will probably seem small in the future, can be made without adjustment and co-ordination with existing means of transportation. This may involve special routes to

take advantage of the flexibility of the bus, or where extensions of rail systems are not justified. One of the greatest fields, and one that has only recently begun to be developed, is with the public that would otherwise travel in private automobiles or in taxicabs. In the large cities, especially where the private car is used with difficulty on account of traffic congestion or lack of parking facilities, public convenience and necessity will inevitably lead to the use of a large number of buses. The need for this has been emphasized in New York City, where both the Transit Commission and the city administration have come out in favor of buses as against street cars, either to serve as feeders or to replace certain parts of the existing surface rail system.

The problems just mentioned are for the transportation man, the bus operator, to solve in co-operation with city authorities and others interested in the transportation problem. There is a responsibility here also for the makers of buses, if the public is to be furnished with safe and comfortable service, and the operator to render this with a fair profit to himself.

In the not very distant past, public service commissions have rejected applications for permits to operate buses, on the ground that the vehicles proposed for use were designed for other work, the reason being that they could be readily transferred from bus service in case the returns were not satisfactory. Such vehicles would not satisfy either public safety or convenience, since the latter involved continuous service.

The experience of bus operators indicates that equipment must be designed for the service, and that rebuilt passenger cars or trucks furnished with bus bodies will not do. It is true that these vehicles have given good service, but better designs must be provided in the future, and bus operator and vehicle maker must work together to secure them, if the real future of bus transportation, which lies after all in satisfying the public because of its inherent and essential merits, is to be secured.

The article appearing on page 277 in the June issue should have given credit to Daniel L. Turner. This article is an abstract of his report to the New York Transit Commission.



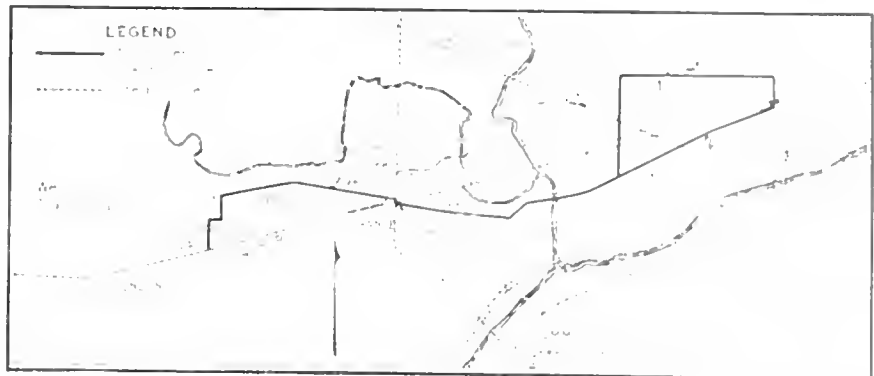
# New Bus Company for Chicago Suburbs

How One Company Picked Its Route to Get a Steady Rush-Hour Traffic—  
Service to the Public the Motto—Newspaper Advertising Used  
Successfully to Merchandise Its Service—Patrons Are  
Buying Securities to Help Finance Additional Buses

ON SEPT. 3, 1922, the West Suburban Transportation Company inaugurated motor bus service from the Western Electric Company's plant in Cicero to Fullersburg. The inauguration of the service was not without opposition, for it took a year's negotiation with the municipalities and the Illinois Commerce Commission to secure the necessary certificate of convenience and necessity for this operation. No sooner had the company begun to exercise its rights to operate than the Chicago & West Towns Street Railway, which also operates through some of the territory served, appealed to the courts for relief from what was claimed to be direct competition. A decision of the State Supreme Court last month affirms the decision of the lower court holding that the commission overstepped its powers in granting the bus company its certificate of convenience and necessity. The bus company, however, appealed to the State Supreme Court, for a rehearing, and pending further hearing in October continues operation.

The routes, shown on the accompanying map, extend from Cicero to Hinsdale. The Western Electric plant, located at the Cicero terminal, with its 20,000 employees, gives the transportation company a rush-hour traffic of considerable volume. The company has available for service five International buses seating thirty passengers; two Macks, seating twenty-eight, and two Reos that seat twenty-two passengers.

"Service" has been the motto of this newly organized company. Strenuous effort is being made with the present equipment to meet the ever-increasing needs of the public. A fifteen-minute schedule is maintained during the day, while during the rush-hour periods all buses are in operation on a seven-minute headway. The fifteen-minute headway is maintained by the use of only five buses, leaving four each day for inspection and overhauling. To appreciate the need of adequate transportation facilities it is only neces-



The bus route serves seven townships and reaches the Western Electric Co. plant.

sary to visit the Western Electric station of the West Suburban Transportation Company during the evening peak. Frequently as many as seventy passengers will crowd into one of the larger International buses, all passengers realizing that the company is doing its utmost to supply more adequate service.

Plans are now under way to increase the number of buses by at least ten. In order to finance them, and to make the people feel they are a part of this transportation company, a limited amount of Class A securities has been authorized by the

Illinois Commerce Commission to be sold to the public. The management believes that through this sale of stock to the patrons of the road they will develop a greater interest in the company's success.

During the morning rush hour buses are started from various points along the route in order to best pick up the crowd, which grows heavier as the Western Electric plant is approached. The first bus, which leaves Berwyn at 5:15 a.m., is able to make three trips before the morning rush hour is over, and not only is it loaded going to the Western



Interior of buses—leather—cool seats—comfortable—well lighted. Note the commodious aisle, the standard seats and windows.

# ANNOUNCEMENT

## West Suburban Transportation Company

Authorized by **ILLINOIS COMMERCE COMMISSION** Authorization No. 1324

**CLASS A SECURITY.**

**TREASURY STOCK**

**FULLY PAID**

**NON-ASSESSABLE** ✓

To Whom It May Concern:

I accepted the Presidency of the West Suburban Transportation Company, only after I had made a very thorough investigation of the possibility to make money along with the object and methods of the company. My investigation showed me ten good reasons why an investment in the company should be profitable:

- (1) That the bus business is one of the most profitable of all businesses.
- (2) That the bus business is in its infancy.
- (3) That the West Suburban has complied with all state laws and is a class "A" security.
- (4) That it will simplify the transportation for thousands of people.
- (5) That it is a going business and not an experiment.
- (6) That it will improve the value of property along its route.
- (7) An Illinois company owned by Illinois capital and managed by Illinois men.
- (8) A community company owned by the people who patronize it.
- (9) Its activities being limited only by its capital.
- (10) A safe and conservative investment.

There are many other reasons why everyone should join in this home industry, which I will submit on request.

Yours very truly,

A. L. WHITMER.

### L A W

Securities, the inherent qualities of which assure their sale and disposition without the perpetration of fraud, which shall be known as securities in Class "A"

Make your reservation in person or by letter to our local office.

TO WHOM IT MAY CONCERN:

As a realtor in Brookfield, and being personally interested in the operation of the West Suburban Transportation Company, I am in a position to say that the bus line, now in operation, is the answer to our long endured need of adequate transportation for this vicinity. Its ever growing popularity, despite many outside hindrances, has proved beyond a doubt that it is here to stay. Now, with the improved service, which is being installed, it has become a vital necessity.

To quote from my own benefit derived from this system of transportation, I have sold One Hundred Thousand Dollars worth of real property since it has been put into operation. It has increased the value of the land at least forty per cent and will increase the value of property wherever the bus line may be extended. The main feature is, that it will bring a heretofore neglected territory into direct connection with Chicago.

Therefore I wish to call your attention to the fact that it is to your interest that you give us your sincere cooperation and financial support when opportunity offers.

Yours very truly,

JOHN KRISTOFEK.

All common stock, no bonds, no preferred stock, no prior liens against the company.



The full earning power of every dollar invested belongs to the stockholders.

### DIRECTORS

A. L. WHITMER,  
Chicago Nat'l. Life Ins. Co.  
Chicago Nat'l. Underwriters Co.

JOHN KRISTOFEK,  
Real Estate

J. PETRU,  
Real Estate

HARRY JENSEN,  
Township School Trustee

M. J. CLOHESEY,  
Real Estate

GEO. SCHRAD,  
Owner  
Mt. Auburn Cemetery

J. MALLOY,  
Transportation Expert

LOUIS R. COTTER, Cashier  
Chicago Nat'l. Life Ins. Co.

P. W. ROWLAND,  
Traffic Manager

LEE D. MATHIAS,  
Attorney-at-Law.

WILLIAM DE SHETLEY & CO.  
4740 1/2 West 22nd Street, at 48th Avenue,  
CICERO, ILLINOIS.

### COUPON

Without assuming any obligations I am interested in knowing how I, as an individual, may help increase the Motor Bus service.

Name \_\_\_\_\_

Address \_\_\_\_\_

To Whom It May Concern:

Being a heavy property owner on the line and having a financial interest in the West Suburban Transportation Company and knowing everyone connected with the above Company, I will absolutely vouch for every man as to their sincerity, honesty and integrity. I realize the great necessity of such a Company and I have aided in securing from the State of Illinois, through the Illinois Commerce Commission, a franchise for the West Suburban Transportation Company to operate.

However, I intend that this Company shall operate on a safe, sound and satisfactory basis and help relieve the conditions now existing. Should we receive the patronage we deserve I can assure you of handsome returns.

Yours very truly,

THOMAS CAREY.

### STATE OF ILLINOIS ILLINOIS COMMERCE COMMISSION

In the matter of the application of the West Suburban Transportation Company, Inc., for a certificate of convenience and necessity to operate a motor bus line between Cicero, Ill., and Hinsdale, Illinois and intervening points.

11915

### CERTIFICATE OF CONVENIENCE AND NECESSITY. BY THE COMMISSION:

The West Suburban Transportation Company, Inc., a corporation organized and existing by virtue of the laws of the State of Illinois, having heretofore applied to the Commission for a certificate of convenience and necessity and authority to operate motor vehicles over the following routes:

Route 1. Beginning at 48th Avenue and 22nd Street, west on 22nd Street to Oak Park Avenue, south on Oak Park Avenue to Ogden Avenue, thence west on Ogden Avenue to Hinsdale by way of Berwyn, Riverside, Lyons, Brookfield, Congress Park, La Grange, LaGrange Park, Western Springs and Fullersburg.

Route 2. Beginning at 22nd Street and 18th Avenue south to Ogden Avenue, west on Ogden Avenue to Hinsdale by way of Clyde, Berwyn, Riverside, Lyons, Brookfield, Congress Park, La Grange, LaGrange Park, Western Springs and Fullersburg. The Commission for the transportation of passengers and property, and the applicant having heretofore on April 19, 1922, entered its finding and order upon said application, which order is hereby made a part hereof, and the applicant having fully complied with all the provisions of said order of April 19, 1922;

IT IS THEREFORE ORDERED that the West Suburban Transportation Company, Inc., and it is hereby granted a certificate of convenience and necessity and given authority to operate motor vehicles between the points set forth herein, and said company is hereby authorized to transport passengers and property for hire under the terms and conditions set forth in the said order of April 19, 1922.

By order of the Commission, at Springfield, Illinois, this 21st day of June, 1922.

Secretary.

Seal

West Suburban Transportation Co. Gentlemen:

If I had my way I'd tear out that rotten car line that runs up the middle of 22nd Street that looks like a Florida swamp, dump the junk into the Des Plaines river, pave the rest of the street and install all motor busses. Absolutely!

FRANK J. SCHINDLER.

West Suburban Transportation Co. Gentlemen:

Your motor bus service between Lyons and LaGrange is a great convenience to a large portion of our clientele, who live in Lyons, Summit and Argo, as most of the hospital work of that section is cared for in LaGrange. Hope you will soon be able to locate a regular passenger station in La Grange.

LA GRANGE SANITARIUM AND HOSPITAL.

By Edward T. Secor, M. D.

West Suburban Transportation Co. Gentlemen:

I take great pleasure in recommending your company, more cars mean more money in your cash register.

JUDGE GEORGE A. SCHWITZER.

West Suburban Transportation Co. Gentlemen:

Will use busses every day beginning April 1st.

WM. E. MERLE.

West Suburban Transportation Co. Gentlemen:

Returning your card, the writer wishes to advise that he believes your service to be a matter of great public convenience to the communities served and of service to a great many individuals who would otherwise be inconvenienced on account of the lack of facilities previously existing, and if the traffic handled indicates that you are justified in adding more busses to your fleet, would be pleased to see the service extended in the manner you contemplate.

JOHN C. TULLY.

West Suburban Transportation Company. Gentlemen:

Work downtown, cannot use it daily but sure appreciate the convenience your busses furnish for towns along Ogden Avenue and west side of Chicago.

JOSEPH J. VILETE.

Electric plant, but it is loaded on at least two of these trips in the westward direction. The cause for this movement of people westward has been the rapid growth of the district along Ogden Avenue and the consequent call for laborers and construction men. It has been estimated by the company that fully 200 buildings have been erected during the time that the bus company has been in operation.

The fare is 10 cents cash, or three tokens for 20 cents, pay-as-you-enter, to Congress Park, a distance of  $4\frac{1}{2}$  miles. An additional 10 cents is charged for the ride from Congress Park into the village of Hinsdale. No operating figures and cost data are as yet available. It is said, however, that operations have been profitable. Recently the company rented a garage and is employing its own mechanics.

The repair work is done during the day on the four buses which are not in operation. Each day a repair card is filled out by the operator for the particular bus he is driving. Upon this is noted the condition of the engine, the chassis, the body, the braking mechanism, or any other feature which does not function properly. A mechanic looks over these cars at the end of the day and will pull out of service that bus which needs attention. In this way, an attempt is being made to maintain the buses on a very effective schedule and no delays so far have been experienced by faulty equipment.

It is thought that a great future lies ahead of this company and its bus operation, inasmuch as the line passes through the forest preserve and very near the new zoological gardens which have been laid out just outside of Chicago. Ten to twelve picnic groves are very easily reached by means of this bus line, and in addition the company supplies transportation facilities for the people who live in and between towns through which the bus passes.

The company has done much to sell its transportation to the public by means of advertisements in various local papers and by a well-canvassed return postcard which was sent to those living on or near the line, asking for their views in regard to the matter. The replies were very commendable and strengthened the opinion of the company that the line extended through a territory where the service filled a want long felt by the communities involved.

## American Practice Followed in English Double Decker

London General Omnibus Company Develops a Low-Level Bus with a Kick-Up Frame, a Roof Over the Top Deck, and Other Features Used in This Country

**D**URING May the London General Omnibus Company put into service a number of buses of a new type. These are double deckers with an open top, but otherwise similar to the vehicle shown in the illustration. Some of the closed-top vehicles have been built for experimental purposes, but have not yet been approved for service in London. It is expected, however, that the police authorities, who have broad powers in deter-

N. S. vehicle, however, has a low-level frame, this replacing the flitch or built-up wood and steel construction previously used. The latest frame drops down just back of the engine and also has a kick-up over the rear axle. Back of the kick-up, however, the frame is several inches lower than the main section between the wheels.

The chassis design has several other novel features. While the



Double decker bus (type N. S.) now in use by L.G.O. system in London. Top is of an experimental nature, and can be removed in good weather

mining the vehicle construction that may be used for bus service in London, will permit the trial of the new covered-top vehicle during the winter, with a view to its wider adoption if it proves popular with the public. The roof shown is of the convertible type, and can easily be removed when not needed.

At present about 100 of the type N. S. (an abbreviation for *nulli secundus*, Latin phrase meaning second to none) are being built and it is expected this will be continued at the rate of fifty a week until 1,000 of the new design are in service. They will replace the type B double-decker of thirty-four-passenger capacity, which have been in use for a number of years. The latest construction is of fifty-two-passenger capacity, whereas type S, the design put out about two years ago, has seats for fifty-four passengers. The

inverted type worm used on the type S has been retained, a second reduction is used. Pinions are mounted on the end of the axle shafts, and these drive through internal gears on each wheel.

The rear platform is about 13 in. from the ground, the floor of the vehicle being 8 in. higher. This is a drop of some 12 in., as compared with the S type bus. As a result, only one step, direct onto the platform, instead of two, is required. This is obtained without lessening the diameter of the rear wheels, which remains 41 in. as before. Instead of the chain type transmission, the new design has a constant mesh gear construction, in which the gears are brought into action by sliding dogs.

There are now some 3,500 buses owned and operated by the London General Omnibus Company. In addi-

tion, it supervises the operation of some 260 buses of the Tilling-Stevens (gasoline electric) type. Besides these there are some fifty independent operators, of one or two vehicles, working in the greater city. These use the conventional double-deck vehicles fitted mostly on Leyland or Straker-Squires chassis. There is no monopoly in the bus business in London, and any owner can operate over any route, no matter how well served by previous lines, if his vehicle satisfies the requirements of the police authorities. There have been many committees, boards of inquiry, etc., to study the traffic situation, but since it is bound up with the whole local government problem, which itself is in an extremely chaotic condition, there is no hope for

an early remedy. It is generally considered, however, that the various forms of transportation should be co-ordinated, and should be under the supervision of some central

authority. When this is accomplished, then the companies which have built up a business on a route may be protected against the inroads of later competitors.

## Duplex Ticket that Aids Bus Operation

THE accompanying illustration shows a novel form of duplex ticket recently designed by William A. Cameron, the owner of the Capital Bus Line, Ottawa, Canada. As will be noticed the ticket, which is 5½ in. x 8½ in. in size, has three perforated folds. On the top left is the part for recording the fare paid by the passenger, which is carried through from the edge of the passenger's part of the ticket as

shown in the middle by punch marks. The part on the right is for advertising purposes only, and it is by the sale of the front and reverse sides of this coupon that the bus company is able to get its tickets printed without cost to itself. In fact, it is understood that the advertiser was so pleased with the results of this form of advertising that he not only paid the printing and binding costs of the tickets but also the \$25 license fee of one of the buses.

In general, the operations of handling are similar to those of any punched form of duplex ticket. With the ticket folded the part that appears in the middle is facing up. The driver collects fares on the prepayment plan, either before the bus departs or when the passenger boards the bus. When he punches the fare paid, as shown in the column on the right, it is also recorded on that part of the ticket retained on his pad.

Fares paid on inbound trips are separated from those paid on outbound trips by the driver punching the square in the lower right-hand corner. By this arrangement, then, it is possible for records to be kept of the number of passengers by trips in each direction and the amount of fares collected. On the left-hand edge of the passenger's portion of the ticket the stations are listed and the driver is required to punch the places covered by the fare paid. The two left-hand portions when torn off are given to the passenger as an indication that his fare has been paid as indicated by the punch marks. The ticket, which also serves as a hat check, is returned to the driver as the passenger leaves to show fare limit.

The checking page has proved of considerable help in balancing up the conductor's work, as all tickets must be collected by the driver, who also, at the end of the day, must turn them in to the office to be checked with his cash collections and the stubs he has retained.

On the reverse side of the passenger's portion the company has presented some facts of its own, under the caption "Do You Know?"

<b>DO YOU KNOW</b>		Get Good Service by Shopping at <b>A.G. Treiman Limited</b> Ottawa's Largest Departmental Store
.5	That for a small charge we will purchase articles in Ottawa for you.	
.10		
.15	That we welcome suggestions to improve this Bus Service.	
.25		
.35	That our service to you last season was 19,500 miles.	
.40		
.50	That we do our best to run on schedule time. Don't ask us to wait long enough to break this schedule.	
.55		
.65	That if our regular Bus should get out of order we have others	
.75		
.80	That you can rent a Bus to go anywhere on a picnic or other drive.	
.85		
.90	That we run a sight-seeing car daily on a 20 mile drive through Ottawa at a charge of \$1.00 return.	
1.00		
1.25		
1.50		
1.75		

The ticket as it is unfolded. On left coupon the checking figures for indicating fares paid. The rest of this side is for company and paid advertisements

Save Money by Shopping at <b>A.G. Treiman Limited</b> "The Store that Sets the Pace"	<b>STATION</b>	<b>Fare Paid</b>
	Ottawa	.5
	Hog + Back	.10
	Wright's Grove	.15
	Black Rapids	.25
	Long Island	.35
	Maple Hill	.40
	Manotick	.50
	Watterson	.55
	Tod's Corners	.65
Carsonby	.70	
North Gower	.75	
Kars	.85	
Osgoode	.90	
Special	1.00	
	1.25	
	1.50	
	1.75	

Return this receipt as evidence of fare paid as it must be returned to chauffeur when you leave the car. Wm. A. CAMERON, Prop. Phone Carling 2985

**CAPITAL BUS LINES**  
Ottawa—Prescott Highway Div.

If Return  
Punch Here

Reverse side of duplex ticket used. The middle and left-hand portion shown is issued to the passenger—punched to indicate fare paid and points applying. The left-hand portion contains advertising

# Improved Schedules Greatly Increase Traffic in Elizabeth

By Leo F. Conlon

Newark, N. J.

**B**Y HELPFUL co-operation and the elimination of layover time and unified control the owners of eighteen buses on the Elizabeth Avenue route, during the first four months of this year, have handled an increase in traffic of 16.75 per cent with a corresponding increase in revenue.

Proper co-operation in any undertaking generally brings about success, as can be demonstrated by the operation of the buses on Bus Route No. 1, Elizabeth, N. J., by individual bus owners. The bus owners have been brought together by an association known as the Elizabeth Avenue Bus Owners' Association, with headquarters at 246 Marshall Street, Elizabeth, N. J.

By means of this association, individually operated and owned buses have developed successful bus transportation over a route which starts at Chestnut Street and East Broad Street, thence along East Broad Street to South Broad Street, Elizabeth Avenue, Seventh Street, Marshall Street, First Street, Pine Street, Third Street, Trumbull Street to the Elizabethport Station, returning by practically the same route. Certain bus trips are operated over Trumbull Street from their regular route during the rush hours to the Singer Sewing Machine plant, at Elizabethport, which employs approximately 7,500 men and women.

The route is approximately 3 miles in length and serves to link the business section of Elizabeth with the residential as well as the industrial section known as Elizabethport. The Pennsylvania Railroad and the Central Railroad of New Jersey enter Elizabeth, and their stations are located very near the business center. Many commuters enter and leave Elizabeth on these roads and are carried to their homes by buses. A substantial portion of the bus traffic originates at the Broad Street Arch, which is the Pennsylvania Railroad Bridge. The majority of people who offer themselves for transportation are working people and the quick,



*Boarding bus at Singer Sewing Machine plant, Elizabethport, N. J.*

flexible service which the buses render for a 5-cent fare has made this means of transportation very popular despite the fact that the local street railway also gives adequate service for an 8-cent cash fare or at 7½ cents if four tickets for 30 cents are purchased. The high development of this motor bus line has come about by close supervision on the part of the state and city inspectors with the co-operation of the Elizabeth Avenue Bus Owners' Association.

The Bus Owners' Association elects its president, vice-president, secretary and treasurer and employs counsel to advise it in all legal matters. The officers are elected every year on the tenth day of October. The owners operate under a mutual agreement which is considered a contract. This agreement is strengthened by the fact that each owner has to put up \$100 cash which is deposited in a provident account at the time of signing. The experience has been that the bus owners have had little trouble in carrying out the conditions in the agreement, with the result that in most cases harmony exists during the year, resulting in improved service to the public and

greater financial returns to the operators. The association loans and advances money on account to bus owners for mutual assistance.

The association elects a board of managers, consisting of five members, for a period of three months. The board of managers meets each week and the members are paid \$1.60 for attending the meeting, and if absent without a reasonable excuse, are fined \$2. The powers delegated to the board of managers are very broad and involve the work of handling complaints, supervising the service, disciplining the drivers and fining the owners for violations of the city as well as the association's traffic rules and regulations.

The association employs two starters, one bookkeeper, one inspector and a supervisor, who now happens to also be the president of the association. The reports and minutes of the board of managers are read at each regular meeting of the Bus Association and incorporated in its proceedings. All recommendations as to fines and suggestions as to discipline which are recommended by the board of managers are adopted by the association. Fines of \$2 are imposed on the owners for bus

drivers who fail to close their service doors and who allow passengers to ride on the steps. Fines of \$1 are imposed on the owners whose drivers fail to register fares. Numerous other fines are imposed by the association upon the owners, according to the magnitude of the offense. All fines for violations are deposited in a provident account. Reports of fines are sent to the city traffic supervisor.

The operators are allowed a definite sum of money for each trip and each operator is required to make a certain number of round trips

the fines which are to be imposed. All fare collection receipts on buses have to be turned in by 1 o'clock each day for the day preceding. Failure to make returns by 1 o'clock involves a fine. The bookkeeper handles the money, and all accounts are arranged so that each week's receipts and the amount of money to be given to each owner is indicated clearly. By this arrangement disputes are avoided. The buses are compelled to pay 5 per cent of their gross receipts to the city. This return is made monthly. In 1922 the gross receipts turned in to the city

behind the driver's seat to the door corner post, thus preventing passengers from blocking the view of the bus operators and interfering with the operation of the gear-shifting levers and brakes. The buses are painted with the number of the city license and are equipped with plates furnished by the Public Utility Commission.

The line is operated on a schedule which is prepared by the Bus Association, and approved by the city supervisor, and at the present time the operators allow fifty-one minutes for a round trip. The time-point schedule is as follows:

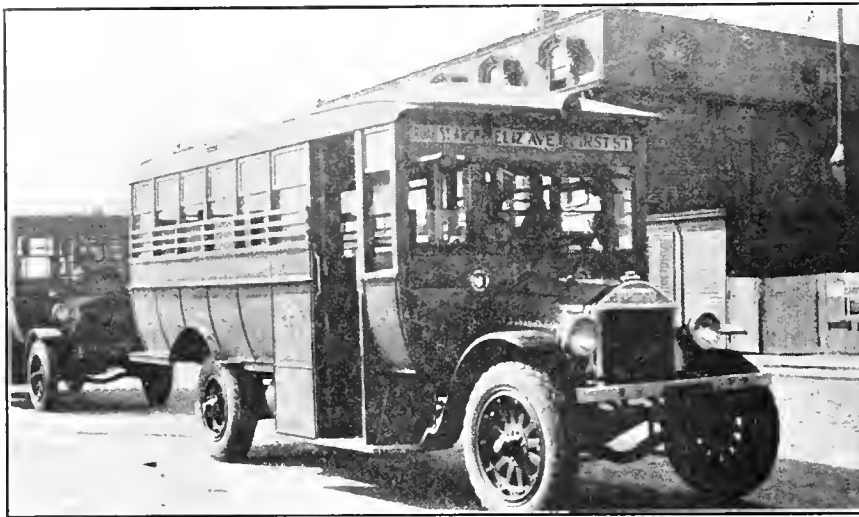
OUTBOUND TRIPS		Minutes
Terminal to First and Marshall Streets	.....	10
First and Marshall Streets to High Street	.....	5
High Street to Broad Street	.....	5
Broad Street to Chestnut Street	.....	6
		<hr/> 26
INBOUND TRIPS		
Chestnut Street to Broad Street	....	6
Broad Street to High Street	.....	5
High Street to First and Marshall Streets	.....	5
First and Marshall Streets to Terminal	.....	9
Round trip	.....	<hr/> 51

Allowing a three-minute layover, the eighteen buses can provide a three-minute headway in the rush hours. In the non-rush hours a four-minute headway is maintained. The great success of this line has been due to the fact that the layover time has been minimized, resulting in the operation of a greater number of trips, which has bettered the service and increased the number of riders.

It is apparent from the operation of this line that other lines can be just as successful in their operation provided the bus owners get together and organize, so that the operation is put under a unified control.

### Brazil and Salvador to Adopt the Bus

A BUS line with regular schedule is to be maintained between the Quinta Railway station in the city of Rio Grande and the city of Santa Victoria in the extreme southeastern corner of the state of Rio Grande do Sul, Brazil, according to a report from Assistant Trade Commissioner M. A. Cramer. The distance between these points is about 175 kilometers. A motor bus line will also undoubtedly be established in Salvador if the government carries out its plans to pave the street in the city of San Salvador in the near future, says Consul L. W. Franklin. There are no organized lines in the republic at present, although a few garages have passenger cars for hire.



Type of bus used on Route No. 1, Elizabeth, N. J. Seats twenty-five passengers

each day in order to share in the pool. All receipts on this line are put into a general pool and are equally divided at the end of each week among the various owners. Certain deductions are made from the total receipts of the bus operator. These deductions are in the nature of fines and general operating costs which are required by the association in properly supervising the line.

#### FARE COLLECTION

All buses are equipped with fare boxes and cord operated recording registers. No register can be changed or replaced in case of mechanical trouble unless it is first approved by the city supervisor, who takes the last reading of the defective clock and installs a new clock which is set to read at the same reading.

The association has a secret system of inspection for drivers. This has minimized the loss of fares through dishonest drivers. Complaints of dishonest drivers are submitted to the association at its regular meeting and the owners are advised of the investigation as well as

of Elizabeth for this line was \$219,224.55 and the total number of passengers carried was 4,384,491.

During the first four months of 1923 the gross receipts have totaled \$80,244.30 and the passengers carried number 1,604,886, compared to gross receipts of \$68,722.25 and passengers carried 1,374,445 for the corresponding months in 1922.

The buses operating on this route are all of the same standard as to body construction. An ordinance of the city of Elizabeth provides that no bus body shall be less than 1½ tons in weight and not less than 15 ft. 6 in. in length nor less than 7 ft. in width. The buses are painted and lettered in a uniform manner and equipped with destination signs which can be illuminated at night. The buses are equipped with service doors to minimize accidents due to step riding and overcrowding. The buses are further required to have partitions installed behind the driver's seat to prevent the driver from talking to passengers, and, further, each bus must be provided with a rail which extends from the partition



In Newburgh and Vicinity the Space for Bus Advertising Cards Is Sold to an Agency for 50 per Cent of the Derived Revenue—Rates to Advertisers Vary According to the Number of Buses Used—Maximum Rate Is \$1.50 per Card per Bus per Month, Decreasing to \$1 per Card per Bus per Month—A Special Rate Using All Buses Is 55 Cents per Card per Bus per Week

## The Motor Bus Serves as a Suburban Advertising Medium

WITH the motor bus usurping the field of inland transit so extensively in Orange and Ulster Counties, New York State, Newburgh-on-the-Hudson finds itself more than ever the center of a buying population. Operating between this city and the surrounding towns, forty buses are daily running on schedule time; in some sections inaccessible places are now opened up and in others the street car line is gradually becoming a thing of the past.

Bus card advertising is then perhaps the natural outgrowth of the newer method of travel, particularly where it is apparent that the majority of those who ride on these commodious and comfortable motor transports are going to town to do their purchasing. Aware of the great possibilities that this new means of travel has opened up, the Moore-Applegate Advertising Com-

pany, Newburgh, has been engaged for the past eighteen months in interesting the merchants and business offices of the locality to utilize the bus cards as an advertising medium.

### A MATHEMATICAL DEDUCTION

The appeal has been based on practical and sound facts. Statistics of the merchants in Newburgh prove that 65 per cent of the buying is done by the people populating the country towns. On all sides there is industry and thrift. To the north there lies a lucrative fruit belt; to the west is the Wallkill Valley, with its fertility for fruits as well as dairy products; from the south, over the recently constructed Storm King Highway, come the people of West

Point and the thrifty farmers of that vicinity. Newburgh, therefore, an up-to-date city with stores of every kind to answer the needs of the season, is the most logical and accessible shopping center to patronize. Approximately 200,000 of these country residents travel by bus each week to do their weekly buying. It is apparent, then, that "from every hamlet, village and farm," the country folk are the prospective customers to be reached and to be interested by the advertising from the shopping center.

### THE HARD KNOTS

The advertising project was not launched without a due amount of discouragement and difficulty. It was a new thing and the solicitation had to be done by real salesmen. The merchant of the more conservative type preferred to see how the advertising scheme worked out before

*The latest buses carry advertising racks to hold the cards. With lights directly over these racks the cards are readable day and night.*













delving into so new a venture, even at small expenditure. The earlier type of motor bus was not built for card racks and ways and means had to be devised for their accommodation. The forty buses were not always operated under the supervision of one management, but instead represented ten owners' property, whose drivers were wholly indifferent to their interior decoration of anything other than dirt and passengers. The owners had not then realized the value of the bus card as a revenue producer. Then there was the matter of keeping the cards up to date. These frequent changes called for the service of a competent inspector equipped with an automobile who would attend to the work, first at one terminal and then at another, always planning out the shortest distance between several points. It was the incompetence, or rather lack of responsibility, on the part of the bus driver that made the weekly inspection necessary by the advertising company to see that its cards were correctly placed in accordance with the schedules.

#### LAST WORD IN BUSES

At the present time much of the work connected with bus card advertising has become systematized and many of the ups and downs are ancient history. The latest types of bus bodies are constructed with racks and frames to carry cards of a uniform size; a 25-ft. bus will hold thirty cards measuring 11x14, or twenty of the larger size requiring

#### Typical 11 x 14 bus advertising cards used in Newburgh buses

a space and a half or 11x21 in. Another point is, modern equipment includes electric lights so that "he who rides may read"—by day or night. Advertising value is hence more appreciated so that now spaces are in demand and reserved in advance.

#### APPEAL OF PRINTED MESSAGE

The contracts with the advertiser are usually written on a yearly basis with monthly changes stipulated. For the most part these car cards are particularly attractive. Many of them are worded in two color display type, well expressed and easily read. A summer furniture ad conceived to put the reader in the proper mood not only covets an attractive setting for the porch but a desire to utilize it and delve into the latest fiction, suggested by the headline of an adjacent card advertising a local bookshop. In another card, a few words sum up the special rates of an excursion up the Hudson, while the sport clothes to wear are shown in an adjoining card. The eye of the traveler passes along from one to another of these neat signs—all local commercial gossip, all of

interest to the passengers, whether it be the advertising message from a chiropractor, a theatrical notice, news of a worthwhile lecture, or a summer outing at a local resort. Reading between the lines becomes almost a habit to the commuter.

The company handling advertising in Newburgh and vicinity makes a contract with the bus owner, company or individual whereby he receives 50 per cent of the revenue derived from the sale of the space in his buses. This form of contract appeals to the advertising company in that it assures greater co-operation and keener interest than where there is merely a fixed price per bus. Space rates vary, depending on the number of buses and the number of routes utilized. The rates charged the advertisers for one space 11x14 in eight buses each on a different line is \$12 per month; for one space in sixteen buses or two buses per route it is \$20, while for one space in a total of thirty buses on ten different routes the rate is \$30 per month. These rates do not include the printing charge, which for thirty cards in one color is \$5; for two colors there is an additional charge of \$1.

A "special sale" feature is also offered—an 11 x 14-in. card to appear in all thirty-six buses for one week is sold for \$20. This is an ideal means of advertising to a possible 300,000 people outside the city limits. To this is attached the customary printing charge. In consideration of the high newspaper rates

for reaching the attention of country residents, it is readily seen that a brief message can be placed before the buying public at a small fraction of the cost of equivalent space in the local newspaper. While most contracts are usually taken on the yearly basis, it is found that during summer there is greater demand for space, especially with the Hudson River Day Line, summer amusement parks, etc.

Incidental to this method of advertising, 5,000 time-tables are also issued by the advertising company. These contain not only schedules of each line but the connections between ferries and trains. These are in

great demand by the commuters and are distributed through the bus drivers, hotels and business places. Space is sold to the merchants at \$15 a page, measuring 3x4 in. with a minimum space charge of \$3.

#### CONCLUSIONS

Briefly summarized, advertising, which is mutually conceded by merchants and commuters to be essential to the life of a community, is getting across in a most satisfactory way. Assuredly bus transportation is bringing the country district to within a few miles of the city and its bus cards serve as a real guide to the facilities within an accessible radius.

## Simple Yet Effective Fare Collection

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oet	Nov	Dec	15c	20c
<b>Dailey's Automobile</b>												25c	30c
<b>Service</b>												40c	50c
Good for continuous passage on date punched. To be surrendered at destination												60c	75c
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16												80c	.00
27 18 19 20 21 22 23 24 25 26 27 28 29 30 31												1.25	1.50
												1.60	1.75

*Coupon ticket receipt used on line in northern New York*

THE system of fare collection used by F. I. Dailey on his bus lines out of Clayton and Watertown, N. Y., is simple, easy to operate and yet it has protective features which insure a check on the collections of the driver.

The basis of the scheme is a duplex form of coupon ticket receipt. The passenger receipt is white, while that retained by the driver is red. These two checks or receipts are exact duplicates and are bound up alternately in pads or books of twenty-five or fifty as desired. On payment of fare the driver's punches on the white ticket are recorded simultaneously on a red ticket. The accompanying illustration indicates the passenger receipt purchased for a ride from Watertown to Clayton, a distance of 22 miles, for which a fare of \$1 is charged.

The method of punching is indicative of several features; for instance, the number of the bus and the outline of the punch mark indicate on what bus and to which driver the fare was paid. In addition the points applying and direction are indicated. The point

of origin is punched at the beginning of the word, while the point of destination is punched at the end.

All bus drivers as well as ticket agents along the line have different punch marks. In this way it is easy to figure out what the correct collections are for each driver. The rate of fare is posted in the bus and in case of any dispute it can be referred to easily.

Another feature is that fares are collected by a driver for points beyond which he goes. This is perhaps unusual, but nevertheless of considerable convenience to the passenger, for he has only to think of paying his fare once.

Inasmuch as drivers have a duplicate record for settlement purposes the passengers do not give up their receipts when they leave the bus. It is the rule to collect fares of all passengers to destination before leaving terminal and to collect those picked up en route where they board.

As will be noticed, the receipts are not serially numbered. This is not considered necessary inasmuch as the pads contain a fixed number of receipts and settlement must be made

for each to the toll man if there is a dispute. The printing and padding is done locally in Clayton, N. Y.

## Shop Record Should Be Shellacked

THE custom of "shellacking" tags and the headings of shop record cards has gained rapidly in popularity among Western stage posters. Cards on which greasing records are made by the men who grease a large number of cars every night, for example, are sure to be handled with grimy fingers because the greaser is expected to enter his record immediately after each car is finished. By giving a coating of shellac to the column headings and sometimes also to the right and left margins, "smudging" is prevented and any lettering or printing under the protective coating of shellac remains legible as long as the card lasts.

On cardboard tool tags the shellacking is particularly helpful because it not only keeps the records legible, but in the case of the circular tags that come bound with metal, the life of the tag is prolonged indefinitely.

## Trolley-Bus to Be Used in Philadelphia

NINE trolley buses, the first to be installed in Philadelphia, were contracted for on June 1 by the Pennsylvania Rapid Transit Company, a subsidiary company controlled and financed by the Philadelphia Rapid Transit Company. These vehicles will be used to extend transportation service on Oregon Avenue and vicinity serving a number of large and small industrial plants. Other trackless trolley lines are said to be under consideration, and additional routes are expected to be placed in operation in the near future.

The vehicles are being built by the J. G. Brill Company, and the electrical equipment will be furnished by the General Electric Company. The trolley buses will be of the same type as made by the Brill Company for Petersburg, Va., and will seat thirty passengers on five longitudinal and four cross-seats. Each will be equipped with two GE 258 motors and foot-operated contactor-type control. Two sets of No. 00 trolley wire suspended from steel poles 110 ft. apart will comprise the overhead. Two trolley bases and swivel harps are to be used for current collection.

Overman cushion tires are to be used throughout.

The main route will extend from the corner of Oregon and Delaware Avenues through Oregon Avenue to Eighteenth Street and thence to Wolf Street and Passyunk Avenue, a round-trip distance of 5.8 miles. There is a shorter round trip from Wolf Street and Passyunk Avenue to the trolley depot, a distance of 0.9 mile. This trackless trolley line will connect with ten surface car lines of the Philadelphia Rapid Transit Company, to and from which free trans-

fers are to be given. The cash fare will be 7-cents or four tickets for a quarter, which fare is the same as on the local street cars.

The Pennsylvania Rapid Transit Company will operate these trolley buses under an ordinance passed by the City Council, an interesting feature of which is that it does not require the transportation company to maintain the paving.

The over-all length of vehicle is 23 ft. 10½ in. with the length over the vestibule 23 ft. 2½ in. The width over all is 7 ft. 6 in.

## Rochester to Operate Five Automotive Type Trolley Buses

SEVERAL interesting traffic problems are expected to be solved in connection with the New York State Railways' announced plan to operate trackless trolleys in the city of Rochester.

The Genessee River which cuts through Rochester in deep gorge, is spanned by but a few bridges. Unfortunately, these bridges are spaced several miles apart. Paralleling both banks of the river are trolley routes connecting the outskirts of the city with the business section. Because of the location of a large number of factories along the river banks, it is necessary under the present street car transportation system to haul workers living on one side of the river to the heart of the city and to transfer them to cars giving service on the other side in order to get them to their place of business.

The trolley buses will do away with a lot of this extra traveling for they will be operated across Driving Park Bridge, where the parallel trolley car lines are less than a half mile apart. The trolley buses will also connect with several other street car lines that radiate from the heart of the city. Driving Park Bridge, over which the trolley buses are to operate, will not sustain the weight of street cars, and by operating trolley buses, which are several tons lighter in weight, as a shuttle line across town, the length of passenger travel will be materially decreased. Better service will be possible as regards the time element from one point to another, and will also make it possible to eliminate much of the present abuse of transfers. It is now a common habit to go downtown, get a transfer good on the other side of the river, stay downtown to shop,

then ride out on the car and walk but a short distance across the river, thereby obtaining for one fare a round-trip ride.

The new line will use five trolley buses. These are being made by the Brockway Motor Truck Company, Cortland, N. Y. The electrical equipment is being furnished by the General Electric Company. The weight of the buses without load, equipped, is 12,000 lb.; seating capacity, twenty-five; wheel diameter, 36 in.; gear reduction, 10.2:1; average voltage, 550; schedule speed, 8 m.p.h. figured on eight stops per mile.

## China Has 700-Mile Line

BUS service is being furnished between Kalgan and Urga, China, a distance of 700 miles, according to a United States Consular report from Shanghai. Twenty-five touring cars are used on the route, all of American make. The report on their performance is as follows:

"When it is considered that these ordinary five-passenger touring cars are often called on to carry a ton or

a ton and a half of passengers and baggage, their performance is truly remarkable. There are no constructed roads, the road between Kalgan and Urga is an old caravan route, and there are abominable stretches of sand, rock, gravel and dirt. Nevertheless, the cars make the run in about four days."

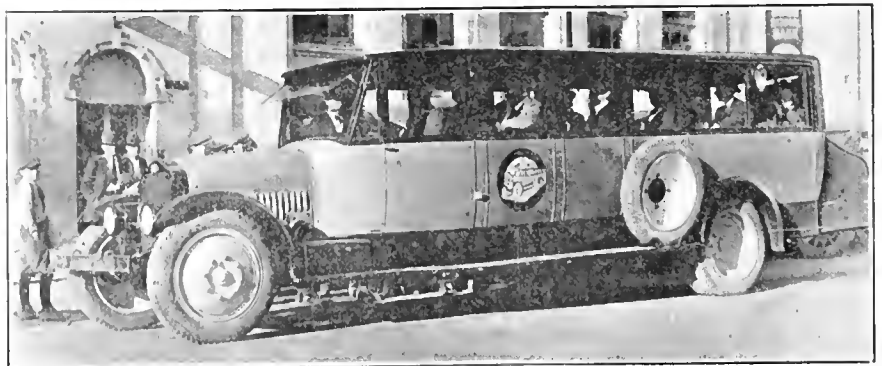
## Denver-Ft. Collins Operation Successful

SOMEBODY said that the motor bus could not "turn the trick," that the public would have to depend upon the railroad for long-distance transportation, yet the Paradox Lines, operating three buses daily, each way, between Denver and Fort Collins, has proved it can be done.

The Public Utilities Commission granted the Paradox company a permit to operate from Denver, via Lafayette, Longmont, Bethoud and Loveland, to Fort Collins, Col. The towns named are the largest in that section of the state, and all are served by the Colorado & Southern Railroad. Still General Manager Swerer of the Paradox states that his company is making money and the company has just purchased another new bus.

The buses used are White Model 50 chassis, on which are mounted bodies made by the Scott Automobile Body Company, Denver. The finish throughout is of Spanish leather and there is comfortable seating capacity for twenty-one passengers. An application has been made for a permit to operate to Boulder, Nederland and Lyons, Colo. The rates in all cases are the same as the railroad. The accompanying photograph shows the latest type of bus.

The Paradox Lines is incorporated for \$50,000. The officers are: George H. Swerer, president; John T. Donovan, vice-president; H. A. Mosley, secretary; C. L. Perry, treasurer, and F. W. Swerer, general manager.



*Paradox bus in operation between Denver and Fort Collins*

# What Motor Bus Regulation Has Accomplished in Utah

*By Warren Stoulnour*

Public Utilities Commissioner,  
Salt Lake City, Utah

There Have Been Many Experiences in Motor Bus Regulation in Utah—An Analysis Indicates the Problems Involved in This Form of Regulation



*One of the buses operating between Salt Lake and Park City in front of the Utah State Capitol*

**I**N UTAH many modes of transportation have come and gone. There are those now living who saw the pony express rider dash madly through the desert sage and reduce the time of travel from Missouri to the Coast a mere matter of a week. Following the pony express rider came the new and elegant horse-drawn stage, with its long leather springs, which carried the gold from the mines and passengers from everywhere to anywhere. This coach, still preserved in Western museums, affords the guide an opportunity to point with pride to the bullet marks where the outlaws beat the Indians to it and collected the fares in kind, without bothering to be regulated by any commission except the sheriff, who had his difficulties. After the stage coach followed the railroads, first steam and then electric. Now comes the automobile stage. As the latest phase in this cycle of development an enterprising young man appeared recently at the State Public Utilities Commission offices and asked to file a schedule showing rates and fares to be charged for trans-

porting passengers by airplane. So there appears now on the horizon a new transportation era, the pony express rider of the sky.

A review of some of the experiences and problems that confronted the Utah commission in regulating automobile stage lines may be helpful in showing the character of problems involved in this kind of regulation. What will be said is in no way disparaging of the citizenship of Utah, because similar problems have arisen in other states, and on the average the citizenry of Utah is about on a par with that of the other states, only in Utah the tendency is to be a little more frank about the matter.

The public utilities law of Utah became effective on March 8, 1917. It authorized the Public Utilities Commission to supervise and regulate automobile passenger and freight transportation, for hire, over regular

routes on public highways. The commission was empowered to fix rates, fares, practices, schedules of time of departure and arrival, require station facilities and make general rules to provide for the safety and convenience of the traveling public. The whole intent of the law was to establish a dependable and adequate service. The law was not intended to, neither does it, organize these services for the private gain of any particular individual as against another individual; but it did provide that before a new service may be initiated, a certificate must be obtained from the commission, after proper showing, stating that both public convenience and public necessity require the service which the applicant desires to render. The plain intent here was to make it possible to build up a dependable service in the interest of the public and to prevent ruthless destruction through unnecessary and wasteful competition.

Quite unsuspectingly the commission looked around for common carriers of persons or property by automobile, with a view to regulating



their service in the interest of the traveling public. The experiences the commission had at first in regulating this class of common carrier might be classed by some of the more timid as fearful and wonderful; but to anyone unfortunate enough, as it were, to be a member of a commission, they are at least very interesting.

The railroads of Utah roughly form a gigantic cross. Lines run from east to west in the northern part of the state, and from north to southeast and north to southwest across the state. In comparison to area, Utah has a rather scant mileage of railroads at present, so it comes about that stage lines extend as much as 200 miles into the interior. In most cases these lines act as feeders for the transcontinental railroads and the interurban electric railways.

Nearly all the numerous mining camps in the state are served, at least during portions of the year, by automobile stage lines. One such mining camp as this is Bingham, about 28 miles southeast of Salt Lake City and at an elevation of about 7,000 ft. The population of this camp varies, roughly, from 1,000 when the copper mines are shut down to 6,000 or 8,000 when the mines are running full blast. There is a large labor turnover so that the demand for transportation is constant and insistent.

At the time the commission started to regulate stages, there were at least ten or twelve different operators running between Salt Lake City and Bingham. Many of these operators were of foreign birth. Some of them, both native and foreign, quickly demonstrated that they had no idea of responsibility nor any intention of rendering service to the public beyond that which would give them the most money for the least work. One of the first things the commission did was to require these operators to run on regular schedules and fix rates of fare. The enforcement of this order kept the commission's inspectors busy. It was fashionable for the stage line drivers to wait until they accumulated what they called a "load." This consisted of waiting until they could crowd nine or ten passengers into a seven-passenger car, departing usually just about on their competitor's schedule. Thus they invited the competitor to wait until he had accomplished the same result for the next operator.

Rivalry ran high in more than one way. And the commission investi-

Utah Transportation Facts			
Population of state			449,306
Area, square miles	Land		82,184
	Water		2,806
Cities with population			
100,000 or over			1
25,000 to 50,000			1
5,000 to 25,000			3
Total			5
Largest city, Salt Lake City, population			118,110
Miles of bus routes			2,008
Number of routes			54
Number of vehicles			153
Inclosed buses			24
Touring cars			129
Miles of electric railways, Jan. 1, 1923			466
Miles of steam railroads, Jan. 1, 1922			2,161

gated accidents where drivers had crowded each other off the road. In the canyons, cars were turned upside down and passengers injured. If a driver experienced car trouble, it was usually the custom for the rest to refuse him aid, thus leaving the passengers of the disabled car helpless on the highway while the car was being repaired. This was considered good form. It happened time after time.

Many of the automobiles were old, second-hand touring cars, bought for a few hundred dollars cash down, the balance being paid for out of revenues received from transporting passengers. In some cases, it came to the attention of the commission that the vendor of the car actually had one of his agents ride on the car and collect the fares until the proper amount was taken in to make the monthly payment. This, it will be observed, simplified the bookkeeping. Others looked upon it, however, as a reflection upon the integrity of the operator.

A specific case will serve to illustrate the length to which competition in the name of public service was carried. Usually when Greek meets Greek anywhere in the United States they open a restaurant, but out in Utah it appears they go into the bus business. Anyway, in this case the Greek operators of a bus line rented a vacant store for a depot on one of Salt Lake's principal streets. Promptly some of the other drivers banded together and rented two other vacant stores, one on each side of the first. All three were gorgeously advertised. The only thing lacking in this situation to make it comparable with the Hebrew clothing store tale is that the fellow in the middle neglected to put up a sign announcing "Main Entrance." The commission early found that there was no set scale of rates for fares. Drivers quoted whatever they thought they could get. A sleek, rotund traveling man assayed considerably more to one of these drivers than some horny

handed son of toil, and these traveling men were greatly sought after. In other words, as one complainant put it, they "grabbed where they could get the most feathers with the least squawk."

A more unsettled and dangerous condition for the traveling public could hardly be imagined. The commission at first found men driving cars who were not even familiar with the highways, and serious accidents were caused on this account. The commission had hardly been functioning a week when a citizen of another state came here, bought a second-hand touring car, and, without the knowledge of the commission, started transporting passengers to one of the smelting towns. He had no financial responsibility whatever, beyond his small initial payment on the car. On almost his first trip his headlights failed. The car, laden with passengers, left the road and turned over in an irrigation ditch. Two of the passengers were drowned and others injured. The same state of affairs existed in many other sections of the state, particularly in connection with travel to and from mining camps. These camps are usually situated in canyons and here real skill is required to operate an automobile.

It required a large amount of work on the part of the commission to weed out the undesirable operators and stabilize the service as was intended by the public utility act. To carry on this work it was necessary even to go so far as to jail some of the worst offenders, and this was not as easy as it might appear.

The fly-by-night operator furnished a particularly irritating form of violation of the law. Especially around the mining camps, miners thought it a splendid idea when the days were sunny and the roads good, to take a car and transport passengers for hire. As a result there were a large number of poachers upon the established service during the summer season. Many of these operators were foreign born and solicited only their fellow countrymen, and in their mother tongue. The inspectors for the commission, not being able to speak more than two or three languages, were considerably handicapped.

In the early court cases, wherein the commission sought conviction for operating without a certificate, some amazing situations developed. In fact, it appeared from evidence presented in court that these gentlemen



bus owners or drivers were not talking about transportation at all, but were discussing the latest revolution in the Balkans. Some of these men even seemed to think that an innocent inquiry was being made about the health of some distant cousin, for all of them appeared to be related, and no insinuation was being made at all about rates, fares and practices for the transportation of persons and property over established routes within the State. Convictions were thus difficult to get. Lack of knowledge of English was always advanced by the lawyers for the defendants, and pitiful attempts at articulation were made for the benefit of the court. It is related that one judge after hearing a series of wheezes and groans was so overcome that his eyes were seen to moisten.

Many problems confronted the commission in selecting one of a number of applicants upon whom to bestow a certificate. For example, in one case the commission had two applicants for authority to operate over a given route. As is customary, each man was represented by a very competent lawyer. One applicant had a large scratch across his face. Upon cross-examination, he stated that he was of a very peaceful disposition and had never been known to fight. He admitted, however, that he transported without charge people of indifferent character, of both sexes, who spoke only of Mr. Volstead to revile him. Upon insistence of the attorney, who asked him if he had been in a fight the night before, he stated, for the benefit of the record, that it was none of said attorney's "damn business." But, lo and behold, when the other applicant was weighed in the scales, it was found that he had been arrested for bootlegging. He, accordingly, admitted having sold a barrel of water to two thirsty but ill-advised Greeks. He seemed quite proud of this exploit, and explained, for the benefit of the commission, how he deceived these prospective buyers. By turning the spigot one direction, he secured a very passable brand of pain-killer; while, by turning it the other way, only water flowed.

Picking a winner out of such applicants was, indeed, difficult, and it seems that in the olden days when Solomon whetted up his sword for the purpose of testing the parentage of the child, he really did not have much of a job. The commission usually declared cases of this kind no contest, and waited until some

citizen in a more perfect state of mentality and legal equilibrium presented himself. Happily, those situations arose mostly in the early days of regulation.

It is a fair cry, however, for example from the days of the old, second-hand touring cars pounding along, to the present equipment operated on the Bingham Stage Line. Photographs show them to be the very best kind of standard, modern equipment, comfortable, convenient and safe. The chaotic condition described briefly has been eliminated in practically all cases. The Salt Lake-Park

the State Penitentiary were sent about the first of May to the top of the pass to above it the snow and clear a way for the stage line.

Last it be thought that Utah is a stormbound state in which for the most part to travel, with each operator run stage line, it is recalled that Utah is some 300 miles north and south by 270 miles east and west, with wide variations in climatic conditions. In the high elevations, during the winter, transportation conditions are difficult, at times while in the southern part of the state, the altitude is comparatively



*One of the typical stages of the Salt Lake-Bingham route.*

City route has been improved the same way. In some instances the commission requires through routes and tickets to be established in connection with one or more stage lines, and close connections, as per published schedule, are required. In other cases stage operation during the winter must be discontinued, as mountain passes ranging upward to 8,000 ft. are encountered, and they are, of course, so filled with snow during the winter months as to be impassable. One such pass was, however, kept open last winter and cars were pulled through by means of caterpillar tractors upon the hard snow. This is not always feasible, on account of the expense. In one or two instances the stage is for some months superseded by a man on snowshoes, who carries supplies into camp. On this kind of a route, of course, there is little or no infringement during the winter season. In another case convicts of

low and cotton, figs and grapes are raised, in season.

Likewise, southern Utah contains some national parks and national monuments that appeal to the lover of outdoors. For this service the commission has authorized a stage line of more than 270 miles in length, extending from Lund, Utah, on the Union Pacific Railroad, to Cedar City, Zion Canyon, Grand Canyon of the Colorado, back northward to Bryce Canyon and Maryvale, on the Denver & Rio Grande Western Railroad, or Lund, on the Union Pacific.

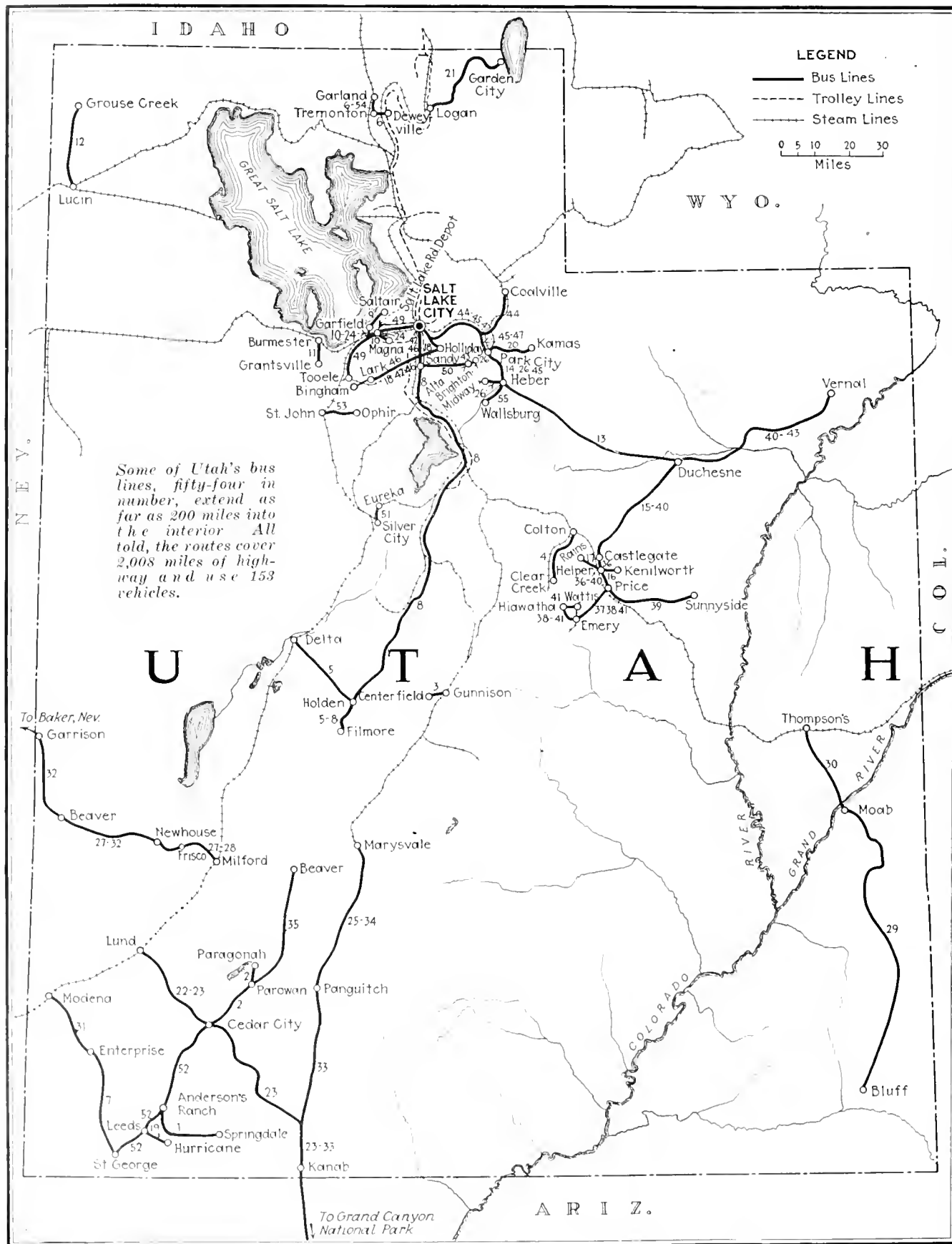
This route requires several days to traverse, and the equipment is such that no one need hesitate to seek transportation. One of the more remarkable things about this line, as far from the south, however, is the fact that often much wild game is encountered.

Before and during the early part of the session of the last Legislature

some of the disappointed litigants in cases before the commission very carefully planned an attack upon the public utilities law, in so far as the regulation of automobile stage lines

was concerned. They stated, insistently and vehemently, that the commission consisted of a "bunch of autocrats, who took the roads away from the people and gave them to one

man." This came about because the commission has discovered that competition between stage lines on the same route does not produce the expected results, financial stability.



Numerous bills were introduced with the idea of remodeling the commission law, so that everyone might run when and as he pleased, and at the same time preserve for the people good service at reasonable rates. Much oratory was spilled and the commission was properly damned; but when the session adjourned, the law remained unchanged because people residing in outlying districts, some of them a hundred or more miles away from the railroad, insisted that the service they were getting under regulation was far better than anything they had known before. It was they who prevented modification of the law.

Formerly the commission granted certificates for the hauling of passengers and express in the same vehicle. This caused so much inconvenience to passengers that it is usual now to require that passengers and express be segregated. To illustrate the predicament it caused at least one passenger: The commission once received a letter from a forlorn traveling salesman, who stated that he had been required to sit on top of a crate of chickens. It seems the poultry thought his tweed suit a new kind of food and industriously attempted to pick the spots off the suit whenever the suit came in contact with the crate. This did not happen very often, however, as the road was rough. The commission has since anticipated situations of this kind.

The law requires published tariffs and schedules to be filed with the commission and posted conspicuously at the various depots of the stage lines; monthly reports must be made to the commission showing the number of passengers, revenues, expenses, etc., and, in addition thereto, this year the commission prescribed a uniform system of accounts for automobile operations.

#### EXPLAINING STATISTICS

Attention is called to the table of statistics which appears above. It will be noted that the column headed "Minimum Cash Fares," which has appeared heretofore in other surveys, has been omitted. As a general rule, the country is not settled as in the East and sometimes there is not even a ranch intervening between termini. In cases where passengers are destined to intermediate points, if any, they are sometimes hauled free, or else charged whatever nominal sum appeals to both themselves and the operator. In other words, the commission has not

### Statistical Information Concerning Motor Bus Operations in Utah as of May 1, 1923

Map Key	Route	One-Way Distance Miles	No. of Vehicles	Buses	Fouring Cars	One-Way Fare	Round Trip Fare	Round Trip Time	Round Trip Rate	Round Trip Time		
1	Anderson's Ranch to Springdale	25	2	5	5	\$2.50	10.00	1	1	1.00		
2	Cedar City to Paragonah (a)	25	2	5	5	1.75	7.00	1	1	1.00		
3	Centerfield to Gunnison Station (a)	6	2	5	5	.50	2.00	2	2	0.45		
4	Colton to Clear Creek	26	2	6	6	3.00	11.00	2	2	1.15		
5	Delta to Fillmore	40	1	7	7	3.00	7.00	1	1	2.30		
6	Deweyville to Garland	7	1	5	5	1.25	18.00	3	3	0.45		
7	Enterprise to St. George	35	1	7	7	2.50	\$4.00	7.11	1	1	2.00	
8	Fillmore to Salt Lake (a)	154	1	8	8	8.00	5.20	1	1	10.00		
9	Garfield to Saltair	4	3	20	7	50	75	12.50	1	1	0.15	
10	Garfield to Salt Lake Rd. Depot	1	3	20	7	15	15.00	4	4	0.05		
11	Grantsville to Burmester (a)	15	2	5	5	1.50	5.10	1	1	5.00		
12	Grouse Creek to Lucin (a)	31	3	5	7	7.00	12.70	1	1	3.30		
13	Heber to Duchesne	70	2	5	7	1.50	2.50	10.00	1	1	2.30	
14	Heber to Park City (a)	15	2	7	5	5.50	12.22	1	1	2.00		
15	Helper to Duchesne	45	1	7	7	5.50	12.22	1	1	2.00		
16	Helper to Kenilworth	5	2	7	7	1.00	1.75	20.00	2	2	1.00	
17	Helper to Rains	9	3	7	7	1.00	1.75	20.00	2	2	1.00	
19	Hurricane to Leeds	5	1	7	7	1.00	1.75	20.00	2	2	1.00	
20	Kamas to Park City (a)	25	1	7	7	1.00	4.00	1	1	5.00		
21	Logan to Bear Lake (a) Garden City	45	3	10	7	5.00	11.22	1	1	6.45		
22	Land to Cedar City	14	2	7	7	2.00	4.00	5.00	1	1	2.30	
23	Land to Grand Canyon Nat'l Park	270	4	7	50	10.00	18.00	1	1	1.00		
24	Magna to Garfield	4	3	20	7	40	75	10.00	4	4	0.15	
25	Marysville to Panguitch	55	1	7	7	4.00	7.20	1	1	1.00		
26	Midway to Park City	8	1	5	5	1.00	12.50	1	1	1.00		
27	Midford to Beaver	32	3	5	7	2.00	6.20	1	1	1.35		
28	Midford to Eisen (a)	17	1	5	7	1.00	6.00	1	1	1.00		
29	Moab to Bluff	100	4	5	7	11.70	11.70	1	1	12.30		
30	Moab to Thompson's	37	1	3	3	3.50	6.50	2	2	2.30		
31	Modena to Enterprise (a)	20	2	2	2	2.00	4.50	12.50	1	1	2.30	
32	Newhouse to Garrison (a)	60	1	7	7	7.00	11.30	1	1	1.00		
33	Panguitch to Kanab (a)	72	1	6	6	6.00	8.30	1	1	1.00		
34	Panguitch to Marysville	45	1	7	3	3.50	3.00	6.70	1	1	5.00	
35	Parowan to Beaver	33	2	5	7	5.7	6.00	1	1	1.00		
36	Pine to Castle Gate	16	4	5	7	1.25	2.00	10.40	6	6	0.50	
37	Pine to Emery	58	1	7	7	1.25	2.00	10.40	6	6	0.50	
38	Pine to Hiawatha	12	3	7	7	1.25	2.00	10.40	6	6	0.50	
39	Pine to Sunnyside	28	4	7	7	1.25	2.00	10.40	6	6	0.50	
40	Pine to Vernal	124	4	7	7	12.00	9.60	1	1	9.30		
41	Pine to Wattis	20	2	5	7	2.25	4.00	11.20	1	1	1.30	
42	Salt Lake to Bingham	30	10	11	25	7	1.50	2.50	5.00	6	6	1.00
43	Salt Lake to Holiday & Brighton (a)	20	2	7	7	1.00	4.00	1	1	2.00		
44	Salt Lake to Coalville	45	1	7	7	3.00	6.60	1	1	2.15		
45	Salt Lake to Heber	66	1	7	7	3.78	6.00	1	1	2.15		
46	Salt Lake to Lark	25	1	7	7	1.50	2.75	6.00	2	2	1.30	
47	Salt Lake to Park City	32	4	11	7	2.00	6.25	4	4	1.00		
48	Salt Lake to Pine Crest	13	2	11	7	1.00	1.50	11.50	2	2	2.00	
49	Salt Lake to Tooele	40	2	11	7	2.00	5.00	2	2	2.00		
50	Sandy to Alta	16	2	15	20	2.25	3.50	13.60	1	1	3.20	
51	Silver City to Eureka	5	1	7	7	35	65	7.00	7	7	7.00	
52	St. George to Cedar City	55	3	5	7	4.00	7.27	1	1	3.00		
53	St. John to Ophir	10	1	7	7	1.00	10.00	1	1	1.00		
54	Tremonton to Garland	4	2	5	5	1.00	1.00	1.00	1	1	1.00	
55	Wallsburg to Heber	14	1	7	7	1.00	7.00	1	1	1.00		

(a) Company also carries freight, using a 1-ton truck. (b) Fare on tracks \$1.75. (c) Runs on Monday and Wednesday. (d) Generally speaking there are no intermediate rates. (e) Fare dependent on direction. (f) Outbound, which is up-hill, the rate is \$2.75, whereas on the down trip the rate is \$1.75. (g) Four day tour.

yet attempted to regulate this sporadic business except in one or two cases where complaints have been made concerning this practice.

In two cases noticed in the table two one-way fares are shown. This comes about because one of the terminals in each route is located near the top of the mountain range and the expense of transporting passengers on the upward or outbound trips is much greater than on the downward or inbound trip. About all that is needed in the way of power is a good set of brakes. These rates are the result of a request on the part of the stage line operators that the down fare be made less than the

fare up, as they believed it would stimulate traffic.

By keeping everlastingly at it the commission has succeeded in greatly improving bus service. The public now knows how much will be exacted in the way of fare and when the stage will leave. Moreover, passengers have a reasonable assurance they will be transported to their destination safely. In short, results have been obtained that justify the law. Bus service in Utah is not organized for profit, because the commission fixes rates that do not permit of large profits. Such monopolies as do exist in Utah in the bus business are monopolies for service, not for gain.

# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, July, 1923

## *A Work-Together Policy Needed*

PRESIDENT HARDING has been hitting some people between the eyes in the speeches which he is making on his present tour. Incidentally he is revealing to the American public that he really has a keener appreciation of the forces that are moving the destiny of the world than many people would have been willing a few weeks ago to concede. The speech which he made in Kansas City on June 22 was a case in point. Among other things he said: "There will never be a backward step in motor transportation." With this as his premise—and it is a sound one—the president argued that we shall do better if we find a plan to co-ordinate this service with the railway, rather than encourage destructive competition. As the president sees it, motor transport already promises relief to the most congested freight terminals through better co-ordination. This is a phase of the matter not within the province of BUS TRANSPORTATION, but when the president said that "the automobile and motor truck have made greater inroads on railway revenue than the electric lines, with their intimate appeal to the local community," he tread on familiar ground. Moreover, he said something mighty significant when he uttered the admonition that the problem of transport by motor cannot be solved by those who commend the policy of confiscation or destruction, nor can it be solved by those who make a prejudicial appeal for political favor. This is undoubtedly a statement of the administration's attitude toward the matter.

If so, it is an attitude that is everywhere finding reflection in the pronouncements of commission bodies representing the public. Doubtless many instances still remain where it appears that the existing carriers have been sorely hurt by the coming of the new mode of transport, but the wounds thus made have already begun to heal, and in a short time will remain only as a memory. The attitude of the administration at Washington as expressed by President Harding has been the attitude of BUS TRANSPORTATION toward the matter from the inception of the paper. There was considerable unwillingness at first in some quarters to see how interests could be reconciled which at a

glance appeared to be so divergent. It was natural and human that this should be so. A great deal of the prejudice has since been removed, but some still remains. In his remarks at Kansas City the President has pointed out the way to the remaining recalcitrants. In doing so, he re-echoed not only the sentiments of BUS TRANSPORTATION but those of the Chamber of Commerce of the United States, Samuel Rea of the Pennsylvania Railroad and other leaders of thought in the transportation world.

—[ EDITORIAL ]—

## *What Body Should Decide Whether a New Line Is Necessary?*

THE decision of the Illinois Supreme Court rendered this week in the case of the West Suburban Transportation Company vs. The Chicago & West Towns Railway Company is published in full in this week's issue for two reasons. One of these is because the system of this bus company had been selected some time ago as the subject of one of the leading articles in this issue. The other reason is the direct bearing which this decision has on the conditions under which competition between bus and trolley will be permitted in Illinois.

Briefly, the facts are that about a year ago the State Public Service Commission, known in Illinois as the Commerce Commission, granted a certificate of convenience and necessity to the company to operate in some of the suburban towns just west of Chicago which are partly served by the Chicago & West Towns Railway. On plea of that railway, however, the validity of this certificate was questioned, and the Supreme Court has now held that not a large enough number of people would be inconvenienced or would be sufficiently inconvenienced by the enterprise to warrant such permission. To quote the word of the decision, "Some individuals—perhaps a considerable number—would be inconvenienced by the operation of the bus line, but it is clear from the record that for the great body of the public it would be neither a convenience nor a necessity. It was not within the authority of the commission to authorize the operation of the bus line for the convenience of a small part of the public already served by other utilities at no very great inconvenience."

With the general principle that the interest of the general public lies in regulated and co-ordinated service, whether operated by one or several companies, all will agree. But in case this policy is followed, two very practical questions will always arise. The first is: What is the number or percentage of persons in a community who have to be inconvenienced and what must be the degree of inconvenience before a new line will be permitted? The second is: If these points are not capable of definition or measurement with mathematical exactitude, what body is best fitted to exercise judgment in passing upon the necessity of such an additional transportation line?

These questions naturally lead up to a consideration of what the real functions are of the public service commission, or whatever name it may be

called in each state. Theoretically, at least, such a commission, with its engineering force, constant study of public needs and authority to conduct hearings for this very purpose, should be in the best possible position to determine the degree of necessity and convenience of a new transportation enterprise.

As the West Suburban Transportation Company has announced its intention of appealing this case to the United States Supreme Court, in case its right to operate under the certificate of the Illinois Commerce Commission is not granted on a rehearing of the case by the Illinois Supreme Court, it is possible that there may be further judicial rulings on the matter.

[ EDITORIAL ]

### *Are You Just Average?*

**W**HAT do you consider your chief concern in conducting a motor bus transportation enterprise? Do you find it necessary to give most of your attention to keeping your buses in running order? Or does economizing on fuel take first place? Possibly the occasional pilfering of a dishonest operator is what worries you most, or maybe you are trying to trim routes or schedules so as to save the expense of layovers.

If you are the average transportation man, nine chances out of ten you are devoting the bulk of your time and efforts toward improvement along one or more of these lines, or similar ones, familiar to all of us. That is what operators of transportation systems have been doing ever since street cars first began to run. And the average stage coach man probably did likewise in his time.

These things are all well enough and necessary enough in their place. But to devote all your efforts along these lines is to miss a more fruitful field that lies open to you. That field is the sale of transportation. It is one thing to provide transportation; it is another to sell it. The average transportation man's idea is to provide this commodity, and then let the public take it or leave it. But that attitude in the long run will end in your unpopularity with the riding public.

Consider for a moment the way of the most successful department store you know. Undoubtedly its management is interested in keeping down expenses and in running the store efficiently, but how much more interested is it in getting the public into the store to buy the goods offered. Note the way our store manager goes about it. He advertises his wares. In divers ways he displays the goods so as to be attractive and desirable to the buying public. He feels out what the public wants, then he hastens to furnish it. His clerks and salespeople are courteous and obliging or else they get discharged.

Look around at the other successful enterprises in your own community. The busiest candy shop, the most popular restaurant, best-attended dance hall. They are all catering to the same discriminating, fault-finding, hard-to-please public, and they are getting away with it. How do they do it? It's no secret for they have learned how to merchandise their wares.

Here then is the opportunity for the motor bus industry, still an infant in its present stage of development, to avoid the colossal mistake or oversight of its predecessors in the transportation business. Now is the time to start right. Give at least as much thought to selling transportation service as to operating it. Look upon the job as something more than merely running motor buses over a fixed route. Consider the motor bus as an automobile available for the pleasure of the man of smallest means and his family? Experience has shown that if a pleasant ride in a comfortable, attractive bus is available, the public will patronize it—and will pay well for it.

This is only one thought. A dozen others will suggest themselves on consideration to the man who is ambitious to be just a little better than the "average."

[ EDITORIAL ]

### *Growing Need of Transportation Demands the Motor Bus*

**T**HE motor bus is the logical result of the public demand for more convenient and accessible transportation. Because the bus can meet the need in the quickest and most satisfactory way it has won a permanent place in the transportation system of the country.

Our living conditions of today demand fast transportation by the most direct route. The motor bus is capable of doing this, for it can climb grades, maneuver around obstructions and "buck" street vehicular traffic better than other means of transport. In other words, it can get over a given route in a shorter space of time.

Although the latest development in the art of transportation, the influence of the bus is rapidly becoming far reaching and new companies with real financial backing are being formed continually. As the business grows, likewise will the number and quality of the vehicles in service.

All this is forecast by the estimate, given elsewhere in this issue, of the field of the bus industry. That it will be better than a billion dollar industry is entirely possible, and within the next few years. The number of buses is increasing constantly, and as business grows owners now operating touring cars, sedans and the like will replace them with bus equipment.

It is not a dream to say that there is a field for several hundred thousand buses. On this basis, the value of equipment, the wages paid, the materials and supplies needed to keep such an industry functioning represent many millions of dollars annually. It is truly a great industry even now, with the field only partly cultivated.

Continued progress, however, depends to a large extent upon the consideration the bus receives, not only from the present owners, but also from the public, the city authorities and the legislators. Present operators must learn to profit by the experience of those in other lines of transportation, to look ahead, to think and study, and not merely measure the future possibilities of the infant industry by its present limitations.

## *A Comfort and Safety Meeting*

**T**HE Society of Automotive Engineers has just finished another of its highly successful summer meetings, as indicated by the report given elsewhere in this issue.

The bus as such was hardly mentioned in the proceedings. Yet the demonstrations and discussions at Spring Lake last month are likely to be of the greatest value to all working for better bus construction.

The reason for this is that fundamentals were considered, and comfort and safety are just as vital to the bus as to the privately owned passenger car.

Comfort as represented by balloon tires and safety by four-wheel brakes—these were the two main subjects taken up, and the large attendance at the sessions, as well as the number of actual vehicles embodying the new tires or brakes, is concrete evidence of the wide interest taken in them by the automotive industry.

On the surface it may seem that the work so far has been mainly for the privately owned passenger car. This is not really the case, however. The heavy touring cars designed to stop quickly at 60 or 70 m.p.h. are certainly the equivalent in braking requirements of a good-sized bus that may make only half that speed. The largest balloon tire shown would carry 1,700 lb., which is heavy enough for small buses. It was said, moreover, that experiments are on the way to provide tires of larger capacity. Then there was the Army six-wheel truck, which provided a good example of a simple four-wheel brake construction.

Production conditions with passenger cars, of the privately owned type at least, are such that it takes a good deal of time to develop a new device and actually get it on the car. There is the average driver to be considered, and the lack of care given the average car is another reason for "making haste slowly." But the bus operator is already showing the way for the automotive industry, and for his own sake he should try out any worth-while developments as soon as they are available.

—[ EDITORIAL ]—

## *Good Drivers Are Scarce, but Irresponsible Drivers Are a Liability*

**D**ISCUSSING careless driving on the part of bus drivers with an owner, the latter recently remarked that he had received several complaints lately concerning bad driving on the part of some of his men, and that he was going to start checking them up.

As a rule, the owner of a bus line doesn't receive many complaints direct. Other motorists do a lot of talking, but for some reason will not take the matter to headquarters, where it belongs.

Of course, with regular schedules and the fast running time expected, drivers must travel along at a fairly good rate of speed. In rolling country especially there are usually not many long stretches of clear road, where the driver can see clearly for any great distance in advance. He finds himself continually dropping down the side of one hill and

climbing the side of another. In view of the fact that a lot of the buses on the road are heavy, and because of the uncomfortableness of an unevenly balanced seat, the drivers follow the middle of the road, as most country roads are crowned.

A recent tour indicated that bad driving is general among the drivers of motor buses. Driver after driver was found not only "hogging" the middle of the road but coming over the tops of hills at a speed of 25 miles an hour or better, without sounding his horn or whistle. In fact, a head-on collision with one of the larger type of motor buses was avoided by very scant inches on account of this practice. If both vehicles had been in the middle of the road there would most probably have been several scare headlines in the local papers.

Such driving cannot but create adverse criticism toward the bus industry, for it makes patrons of the bus lines just a little bit afraid to ride with such drivers, and certainly adds nothing to the merchandising popularity of the bus idea.

What the managers need to do is to go out and tour a bit themselves and meet their own cars on the road. Then they can obtain some first hand information on which they can act.



## **Determining Bus Operating Cost and Profit**

NEW YORK, June 20, 1923.

To the Editor:

In the June, 1923, issue, page 307, under the heading "Some California Bus Operating Costs," appears the item that the number of passengers carried averaged 0.607 "per bus-mile."

Dividing the total number of passengers carried by the total bus-miles as shown does give such a figure. The very natural inference from this statement is that the bus system will make money if the average load is six-tenths of a passenger.

If one passenger was the average load and the rate of fare equaled 5 cents for each mile of the route traveled, then the total revenue must be 5 cents per bus-mile.

Looking at it another way, if one-half of the number of passengers each traveled twice the distance mentioned, i.e., at twice the average fare, the total revenue would be the same, the total expense the same, consequently the profits would be the same. However, the number of passengers computed the same as on page 307 would be 0.304 instead of 0.607.

The writer believes that the average bus operator is interested in a figure of this type as showing him what average loads will pay expenses or make a given profit. This figure will be found by dividing the number of passengers carried times the average miles traveled by the number of bus-miles. Knowing the average rate of fare per mile (for example,



6 miles for 30 cents, 5 miles for 25 cents, etc.), the gross revenue may be divided by this fare rate per mile to find the number of revenue passenger-miles.

The passenger-miles paid for divided by the bus-miles operated gives the figure of the average loads carried to produce the desirable results shown.

A READER.

[ LETTERS TO THE EDITOR ]

### Financing Bus Sales on the Deferred-Payment Plan

NEW YORK, June 8, 1923.

To the Editor:

There is an angle to the sale of omnibuses on time to which I have given a great deal of thought for the past several years and which, in my opinion, would be well worthy of a special article in your good publication.

We know from the statistics compiled by the various organizations of the country, notably the National Automobile Chamber of Commerce, that a vast percentage of motor vehicles are sold on time, and since this is a fundamental condition the sale of an omnibus should be made on the same basis as a piano, talking machine and other merchandise. That is to say, the price to the purchaser should be a time price with a discount for all cash, or for a larger amount of cash paid at the time of the sale than is customary under the usual finance company plan.

In order to carry out such a plan, it must of necessity be approved by the manufacturer and his agents, as well as their distributors and dealers.

The price of an omnibus under these conditions would have figured into it the cost of the usual insurance, interest and finance charges, operative in the territory where the sale originates. With the seller quoting this deferred-payment price, it would save a tremendous amount of time which is now necessary in making the sale of a motor vehicle, and would eliminate the necessity of explaining the various items which go to make up "finance charges."

Such a plan is fundamentally sound, no matter whether the seller is in financial position to handle the time-payment paper direct, discount it, sell it to a local bank, or to dispose of it through one of the finance companies.

To put such a plan into practical effect requires that the manufacturer gather information from the finance companies handling the installment paper on his product in the various territories, adding such finance charges to the trade price of his product in the various territories and advertising this price as the regular price of the product, in the newspapers, magazines, trade papers and, in fact, anywhere that publicity is given to the matter of the price of the product.

The manufacturer, as well as his agents, dealers and distributors, would then advertise a discount for cash, which would be a very substantial one on the average amount involved in the sale of an omnibus. This cash discount would, of course, be equal to the total finance charge, since in making a sale of this character, the seller would then have no

interest in the matter of insurance or the other items that go to make up the finance charge.

As a matter of fact, I am sure that it is the practice of most dealers and distributors in omnibuses to allow some kind of a discount for cash transactions at this time, and where it is not, it is now allowed that too should be added to the total finance charge, subject to deduction in the event of a cash sale.

It seems to me that putting such a plan of execution would drastically reduce sale resistance, not only in connection with the sale of omnibuses but with all other motor vehicles.

GEORGE McLELLAN

[ (Continued) ]

### A Problem for Solution

DENVER, COLO., May 11, 1923.

To the Editor:

There is a question of vital interest to the motor bus business that I have failed to read in your magazine and I would like information to aid us in our difficulty.

As you know, there are but very few men so constructed that they can stand the continuous strain of driving day after day; they break down in the back, and do not recover so as to be of further use in the business.

Can you suggest any preventive measures? We are operating a total of thirteen-passenger buses of four types with seating capacity varying from sixteen to twenty-four passengers. The bus lines run from Greeley to La Junta and from Colorado Springs to Cañon City, all within the state of Colorado, and have a total length of 291 miles, all but 44 miles of which is over dirt roads.

One bus manager has advised supplying a pneumatic cushion for the drivers. Is that beneficial in absorbing vibration?

Any helpful information would be much appreciated.

A. L. GLEASON.

--[ LETTERS TO THE EDITOR ]

### Essential Characteristics for a Small Bus

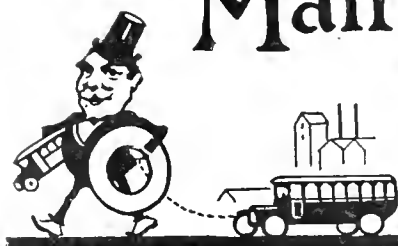
PACHUCA, HIDALGO, MEXICO, June, 19, 1923.

To the Editor:

The article in the June issue "Bus Building by Bus Operators" has caught my attention. There is certainly a big need for a real bus in the eleven to fifteen-passenger size, having approximately the same characteristics and convenience of the big Companion.

I believe the bus operator in mountainous roads, or in places where the large bus is unprofitable, is looking for a quality bus having the following main characteristics: Longer wheelbase than that now found in most light duty trucks; lower center of gravity, probably obtained with the use of 32-in. x 6-in. tires all around; less overhang, and with baggage compartment built on the frame, not as an extension; a powerful motor (the White 15-15 is ideal in this regard); easy riding springs and sturdy construction of both chassis and body.

GUILLERMO FERNANDEZ.



# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Seats for Driver and Passengers

THE Parker Pneumatic Bus Seat Company, Paterson, N. J., is manufacturing the passenger seat shown in the accompanying illustration. Practically the same construction is used for the Parker pneumatic



*Parker pneumatic bus seat for passenger service. Driver's seat similar, but with one cylinder and narrow cushion and back*

driver's seat, except that it is narrower and has only one pneumatic cylinder.

The pneumatic element consists of a pair of cast-iron cylinders, carefully machined, so that the one attached to the seat slides inside the second part, which is attached to the floor of the vehicle. A long heavy spiral spring is set in the lower part, and the interior is filled with air. When the vehicle strikes any inequality in the roadway, the spring in the cylinder can be compressed, while the air there cushions the shock. The reaction that would ordinarily be experienced, if the spring alone were used, is taken up by a suction inside the cylinder, this being created by the close fit and by lubrication. A film of lubricant is carried between the two cylinders. The lubricant can be applied in about five minutes by simply removing the seat, but it is necessary to do this

only about every four months. On the driver's seat a keyway is provided, so as to make sure that it will not turn, but will slide vertically.

Cushions supplied are of the standard nested-spring type, with stuffed back. Covers may be either rattan or heavy imitation leather.

This device is said to be the only one that absorbs road shocks above the floor of the vehicle, and thus gives comfort to individual passengers. The passenger, or the driver, receives only a slow up and down movement, so that he can ride long distances without any feeling of fatigue.

## Four Has Five-Bearing Crankshaft

REMOVABLE cylinder heads, five bearings on the crankshaft and thermosyphon cooling are some of the features of the Model C engines made by Lycoming Motors Corporation, Williamsport, Pa. These engines, of which a cross-section is shown, are built in the following sizes:  $3\frac{1}{2} \times 5$ ;  $3\frac{3}{4} \times 5$ , and  $3\frac{1}{2} \times 5$ , bore and stroke respectively.

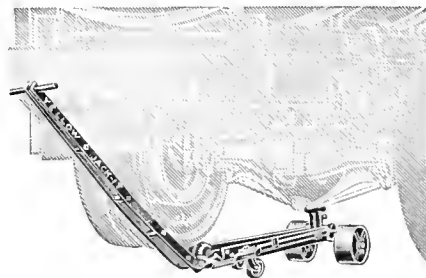
Cylinders are gray iron cast in block, with cast-iron crankcase and pressed-steel oil pan. Pistons are aluminum. Force-feed lubrication is

used for all bearings. Intake and exhaust manifolds are cast integral, and provide a hot box to preheat the fuel before it enters the combustion chamber. Air is preheated before entering the carburetor by a direct connection to the exhaust pipe.

S.A.E. standards are followed with accessories, a mounting being provided for S.A.E. No. 2 generator and S.A.E. No. 1 outboard bearing standard motor. S.A.E. battery ignition mounting is used on the front end, or the magneto can be driven from timing gears. For the transmission the No. 5 S.A.E. flange is supplied.

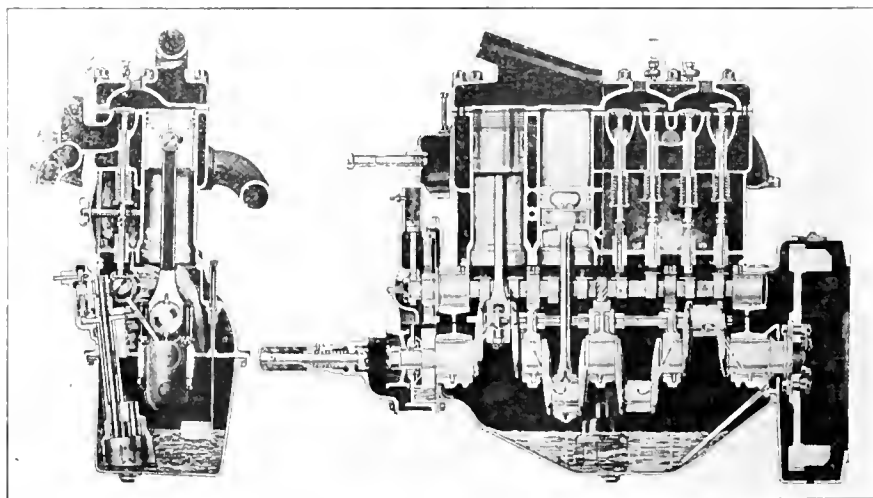
## Dolly Jack Handles Heavy Work

THE Yellow Jack-It Manufacturing Company, Chicago, Ill., is supplying a heavy-duty dolly jack, capacity 10,000 lb., which is said to be particularly useful where heavy bus bodies or chassis must be han-



*This type of dolly jack for heavy duty service*

dled. With this jack, it is claimed, the load is always under complete control because of the ratchet jaw arrangement. Because of this it is impossible for the handle to fly away beyond control. The operator can



*Lycoming Model C engine with five-bearing crankshaft. The end view shows I-head valves and oil pump in crankcase*

stand near the vehicle and push or pull with one hand while steering the load with the other.

The Model 2 jack, shown here, has a handle 52 in. long, is fitted with Hyatt roller bearings and has an adjustment range of 3½ in., a minimum height of 8½ in. The weight is only 184 lb.

### Central Aisle Features New De Luxe Body

THE Garford Motor Truck Company, Lima, Ohio, has developed a twenty-three-passenger de luxe coach body, with a number of novel features. From the outside it appears to be a sedan-type body with separate entrances on the right for each seat. The interior view shown here, however, indicates that a narrow aisle is left down the center. This aisle is only about 13 in. wide, but permits passengers or the driver to pass from the front directly to the rear of the vehicle, or of course it can be used in combination with the side doors. Another interesting feature is the method of separating the smoking compartment at the rear from the main passenger compartment, a swinging door being set in the permanent partition. Then at the very rear, reached by a pair of doors in the back of the body, is a baggage compartment. In order to permit light to pass through to the smoking compartment, the baggage space above the rear seat is filled in with glass and there are glass windows at the top of the rear doors, both being protected by bars in case the space should be filled to the top with baggage.

Outside of these features the body is characterized by the conveniences that are now generally used in high-grade sedan construction for bus work. Handles are placed on the



*Looking toward the rear of de luxe Garford coach; note entrance to smoking compartment, and roof construction*

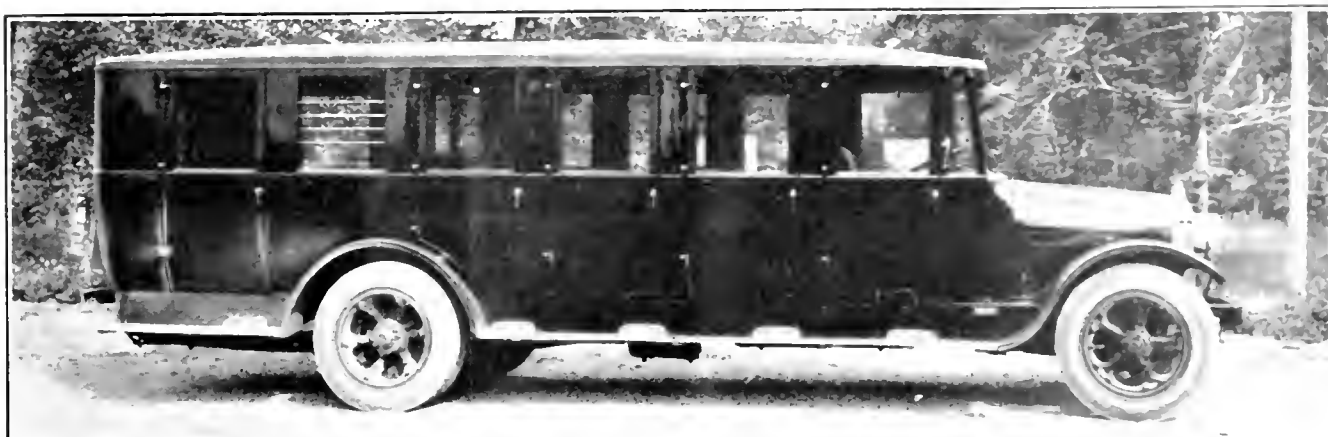
inside of the doors, and on the seat corners to the right of entering passengers. On the floor the linoleum is covered by heavy carpet, which can easily be removed for cleaning.

There are five doors on the right-hand side of the body, one to the driver's seat, three to the main passenger compartment, and the fifth to the smoking compartment. Only two are placed on the left-hand side, one at the front next to the driver, and one in the smoking compartment as an emergency exit. All these doors are fitted with coach lever locks and dovetails and rubber silencers to prevent rattling. Roller curtains are mounted on each window to harmonize with the color of the upholstery. Back of the driver's seat a roller curtain is mounted to avoid light from the rest of the body.

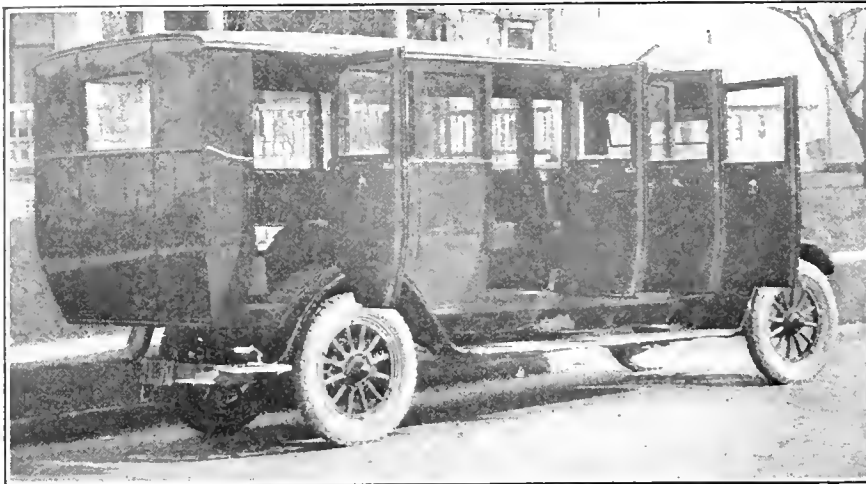
The body has six dome lights, three along each side. It is ventilated by two Nichols-Lintern ventilators mounted in the roof and by two cowl ventilators at the side. Other equipment includes a two-piece windshield, an automatic windshield cleaner, automatic stop signal at the rear, eight nickel-plated coat hooks along the sides with a mirror below, buzzer signals along the side, driver's rear-vision mirror, pipe-system heaters.

It will be noticed that instead of the ordinary soft roof, a raft construction is used, with bows fastened to the side frames and covered with mahogany panels. The side panels are 16-gage half-hardened aluminum.

Over all with baggage compartment the body is 20 ft. long. The headroom inside is 60 in., and the over-all width is 87 in.



*De luxe twenty-three passenger coach mounted on Model 51 B Garford bus chassis*



*Improved McKay sedan-type body, showing seat construction and dome lights*

### Improvements in Sedan-Type Body

THE McKay Carriage Company, Grove City, Pa., has made a number of improvements in models 214 and 214-C bus bodies. These are 12 ft. sixteen-passenger, and 15 ft. twenty-passenger, respectively.

While the former model numbers are retained, the shape of the bodies now in production has been entirely changed, the roof being rounded and the front of the body drawn in. Window casings have been covered with aluminum, all moldings are aluminum, and all seams are covered with molding. Plate glass windows running in felt slide channels are now installed, these being operated by a crank window lifter.

The view shown here, with right-hand doors open, indicates the nest layout used at the rear, with full width rear seat, and longitudinal seats over the wheel housings.

There are four doors on the right-hand side and one on the left, each 27 in. wide and 54 in. high. Headroom inside the body is 58 in., and the width at bottom of windows is

73 in. Cross-seats at the front are laid out on 34 in. centers.

In these bodies the sides are lined with imitation leather, and the ceiling with whipcord to match. Floor is covered with linoleum. Touring car type coil spring cushions and backs, covered with imitation leather, are used.

### Light Duty Chassis Has Standard Parts

THE Chevrolet Motor Company Division of General Motors Corporation, Detroit, Mich., has now in production its Utility Express chassis, suitable for bus transportation work when fitted with a ten-passenger body. The chassis shipping weight is 1,830 lb. and an allowance of 1,000 lb. is made for the body.

The engine used is the four-cylinder, valve-in-head type, 3 $\frac{1}{8}$ -in. bore by 4-in. stroke, which has been developed for the Chevrolet passenger car chassis. While a gravity-feed system with the tank under the seat is shown in the illustration, it is possible with slight changes to use a

vacuum tank on the front of the dash, and place the fuel tank at the rear end of the frame. In fact, the standard equipment has an intake manifold tapped for a suction line to the vacuum tank.

As shown in the side view, the drive is through a clutch, three-speed selective-type transmission, to a spiral-bevel rear axle. Two sets of brakes are placed on the rear wheels. The wooden wheels carry pneumatic tires; on the front 31x4 clincher type are used, while the rear wheels have 34x4 $\frac{1}{2}$  straight-side cords.

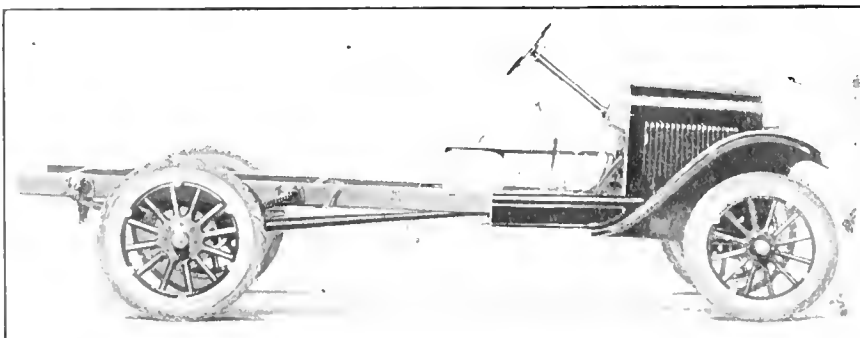
The wheelbase for this chassis is 120 in. and the wheel gage is the standard 56 in. used for passenger car work. Standard equipment includes generator, starter, battery, drum-type headlamps, dimmers, tail lights, speedometer, ammeter, choke control, as well as complete tool equipment.

### Good Window Space on New Bus Body

THE Niagara Motorboat Company, North Tonawanda, N. Y., which for the last four years has been building automobile bodies, has brought out a line of bus bodies, this includes the twenty-five-passenger street car type shown here and also seventeen and twenty-five-passenger sedan or de luxe types. One of the features of the street car design is the large window area, secured by the use of two aluminum castings to hold the upper window. This eliminates the piece of wood that ordinarily braces the top window. To the lower edge of the window screens are attached and are automatically brought into place when the window is pushed up.

Oak sills and ash pillars are used, covered with a panel material of 20-gage automobile sheet steel. The roof is 3-in. Haskelite covered with No. 10 canvas and whitelead.

Lighting is provided by 12-cp. bulbs in dome fixtures, there being six of these, each containing two bulbs. The domes are nickel plated and polished. A Petry heating system is used with 1 $\frac{1}{2}$ -in. pipe led along each side of the floor. Ventilation is by three Nichols-Lintern ventilators installed along the center of the roof. Other equipment includes a curtain back of the driver, door-opening mechanism, controlled by the driver's left hand, windshield and cleaner, and marker lights



*Side view of Chevrolet utility express chassis with fuel tank of under-seat type*



Niagara 25-passenger body, mounted on International Harvester bus chassis

mounted directly in the body, front and rear.

An idea of the size of the body may be obtained from the following dimensions:

	Inches
Length dash to rear.....	230
Headroom.....	74
Width at top of seat cushions.....	81
Width at floor level.....	77½
Service door width.....	28
Aisle width between seat backs.....	16

The inside finish of the ceilings is white enamel, with Spanish leather below the windows, at the floor the sides are covered with sheet metal, while wooden strips are fastened along the aisle.

### Carrying the Body on Ball Bearings

THAT necessity may often become the mother of invention is shown by the development of the Badger ball cushion suspension which is illustrated in the accompanying picture. The device was worked out originally by Dr. William D. Harper for his traveling dentist's office, which it was necessary to drive over rough roads without injury to the delicate instruments. It is intended as a supplement to the ordinary springs and shock absorbers, by giving the body and its load a flexibility independent of the chassis.

Instead of being bolted fast to the frame through bolsters or sills, as is the usual practice, the body using the Badger suspension is carried upon a set of hardened steel balls placed about 30 in. apart the full length of each longitudinal frame member. The view of the complete chassis indicates where these are placed, that is, at each intersection of the frame and channel-shaped cross-members, the latter ordinarily forming part of the body construction. The balls are placed in the space between the top of the frame and the top of the channel, as indi-

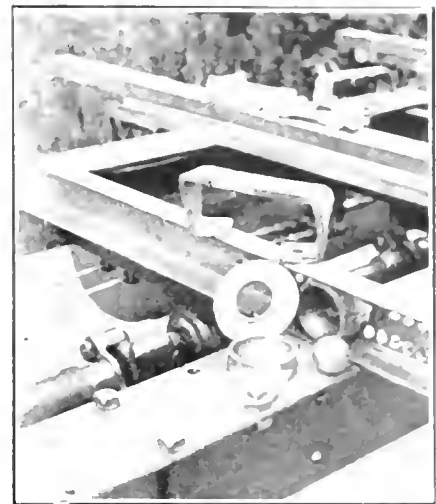
cated in the close-up view. This shows that cup-shaped receptacles are bolted to both longitudinal and cross-members. The radius of the cup is about twice the radius of the ball.

The body mounted on these cross-channels are strapped to the main frame members by means of stirrups. Any sway of the frame causes the steel balls to roll up the incline of the cups. The frame may swerve or vibrate even as much as three-quarters of an inch to either side, but the inertia of the body keeps it moving ahead in a straight line so that it will not immediately follow the motion of the frame. When the balls roll up on the incline the weight of the body bearing on them tends to force the frame back to its former position directly under the body. Thus there is a constant tendency to

cushion any movement in the movement of the frame.

It is claimed by Dr. Harper that suspension will protect the body from the vibration which is received from engine and chassis, so that it will not be affected by the effect of engine vibration and sway. This is important, not only because ordinary vibration causes distortion of the frame, but also as it follows the road irregularities soon loosens the joints and gradually causes deterioration of the wooden body construction.

The device is made by E. B. Badger & Company, Boston, Mass.



Taken down view. The two cups, separating washer, ball, and retaining stirrup are shown



Chassis assembled with Badger cushion suspension, showing body bolsters in position







[illegible]

# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transportation industry.

## Advances in Construction Taken Up by Automotive Engineers

Summer Meeting of S.A.E., Held at New Jersey Shore Resort, Brings Out Division of Opinion Regarding Balloon Tires and Front Wheel Brakes—Examples of Latest Design on Hand for Demonstration

**I**MPROVEMENTS in fundamentals, such as brakes, tires, and fuel, were the main subjects considered at the summer meeting of the Society of Automotive Engineers. Some 800 members and guests gathered at Spring Lake, N. J., for a four-day program (June 19-23) of committee meetings, technical sessions, and actual demonstrations of the equipment.

At the four-wheel brake session papers were read by A. M. Yocum, chief engineer, United States Axle Company, Pottstown, Pa., and Marshall Guillemon, a French engineer with the Renault Company. Mr. Yocum explained the advantages of a front-wheel braking system developed by his company. (This has already been described in BUS TRANSPORTATION, page 242, May issue.) He said that the construction compensates for lining or machining inaccuracy, whereas in most foreign designs only two shoes were in contact, and this might be lost easily owing to changes in loading, or to heat and moisture.

In France, Monsieur Guillemon explained, vehicles operate at a much higher speed than in this country, so that better braking has been found imperative. Brakes on the rear wheels only are a back number if increased speed is to be had, combined with safety. The Renault design makes use of the so-called Servo principle, in which a mechanical device is interposed to increase the power by providing a source of energy independent of the conventional mechanical operation. The energy thus used is the motion of the vehicle itself, exerted through a drum, clutch, gearing and a small differential mechanism. On the front wheels the Perrot system is used, this consisting of a universally jointed brake camshaft carried on the frame side members, and an internally expanding brake. In this construction brakes are fitted on all four wheels and are applied simultaneously by the pedal, while the hand lever controls a set of brakes on the rear wheels independently. The latter, however, is used only to lock the car after it has been brought to a standstill.

Several other engineers who have been trying out four-wheel brakes came out strongly in favor of them, in prin-

ciple at least. Thomas J. Litle, Jr., of the Lincoln Motor Company, said that all cars would put them on sooner or later and that it was feasible to use the external type without a servo attachment. He favored the external brake, as it took three times as much effort to apply the internal type. Lawrence H. Pomeroy, an engineer formerly with prominent English automobile makers, said that four-wheel brakes are surely coming and the thing to do is to make them right. The movement is well started in England, in spite of poor business.

It was agreed, however, that equalization and adjustment were big problems, and also that drivers must receive special training to use four-wheel brakes satisfactorily.

Some of the results of Pierce-Arrow experimental work were described by Charles L. Sheppy, chief engineer of the company. Present cars, he said, are not adapted for the application of four-wheel brakes, and front axles, springs, clips, shackles and steering devices must be designed for the work involved when front brakes are applied. He favored internal brakes because of their better heat dissipation. Figures presented by Mr. Sheppy indicated that at 20 m.p.h. a car with standard brakes could be stopped in 35 ft.; with one type

of front wheel brake it requires 23 ft. Another design permitted the car to be stopped in 15 ft. At 50 m.p.h., the distances were 175 ft. with the standard brakes, and 114 ft. and 90 ft. with the two designs of front wheel brakes.

Still another note of caution was sounded by Henry M. Crane, consulting engineer of New York, and nominee for next year's president of the Society. On large cars, he held, an auxiliary mechanism or excessive pedal motion would be required. On account of the treatment the car gets after it leaves the factory simplicity is essential. In this connection the transmission brake should not be ignored; it gives good cooling and long life, is clear of mud and dirt, and not affected by pedal action on rough roads.

There were a number of demonstration cars present at the meeting, which afforded the members an opportunity to ride in them during their tests of the braking apparatus. Among these were a Renault and an Isotta Fraschini, representatives of French and Italian construction, respectively, a Cadillac car fitted with Lockheed hydraulic four-wheel brakes, Pierce-Arrow with mechanical brakes and a car with the front wheel brakes made by the United States Axle Company. The Quartermaster Corps, United States Army, exhibited a 5-ton truck of the six-wheel type, this having brakes interlocked on the four rear wheels and giving a performance comparable with the four-wheel brake passenger cars.

### MANY BALLOON TIRES ON HAND

To illustrate the paper on the new balloon tires given by J. E. Hale of the Firestone Company (which will be abstracted in an early issue) there were half a dozen cars on hand. These included all types from a Ford touring car to a Pierce Arrow and represented tires of the following makes: Firestone, Fisk, Goodrich, Goodyear, Miller and United States. Mr. Hale predicted that the industry is on the threshold of a great advance in pneumatic tire construction. The new tires will be featured by larger sections, thinner walls and lower pressures (from 15 to 35 lb.) than now used.

In discussing Mr. Hale's paper there was some disagreement with his conclusions. The tire, it was said, is only a small part of the problem, and the big job is to design the rest of the vehicle to make use of the new tires. The questions of rim, steering and fuel consumption were brought up and some doubt expressed as to the value of balloon tires for high speed operation. It was agreed that the main troubles were, as expressed by Mr. Hale, dust raising and stone throwing.

In answer to a question Mr. Hale said that the new forms of tires were being tried out for bus work, but that no definite results had yet been obtained. The grooved tread looks promising as a substitute for non-skid designs, on account of the former's ability to hold the road.

## Meetings, Conventions and Exhibits

- July 10-11—Washington Auto Transportation Association, Tacoma, Wash.
- July 14-15—Idaho Automotive Trade Association, Twin Falls, Idaho.
- July 23-24—National Automobile Dealers' Association, Hotel Drake, Chicago, Ill.
- July 23—Semi-annual meeting of the Alabama Automotive Trades Association, Mobile, Ala.
- Sept. 19-21—Motor Accessory Manufacturers' Association, Boston, Mass.
- Oct. 1-5—National Safety Council & Exhibit, Buffalo, N. Y.
- Oct. 25-26—Society of Automotive Engineers (Production), Cleveland, Ohio.
- Dec. 2—American Association of State Highway Officials, New Orleans, Louisiana.
- Dec. 19—Philadelphia Motor Truck Association, Philadelphia, Pa.

From the operator's standpoint the tire pressures must receive greater attention than heretofore, if the new types are to give the best results. Mr. Hale suggested that the inflation pressure be determined by weighing the load which may be carried with 23 per cent deflection of the tires for each pound of inflation. When this is determined for each end of the car, the value should be stamped on a small plate to be attached somewhere to the vehicle in a conspicuous place. Then the tire should be carefully inflated so as to take within one pound of this correct pressure.

#### DEMONSTRATION OF HEADLIGHTING

The Falge-Brown paper on headlights, which is abstracted elsewhere in this issue was concluded by an outdoor demonstration, showing on the screen the effect of good and bad headlighting. Different lenses, settings of the lamps, and types of headlamp construction, were displayed on this screen to show the various types of illumination. In delivering the paper Mr. Falge emphasized the fact that most of our present troubles are due to improper adjustment. A new form of lens, which he exhibited, is intended to make adjustment easier by eliminating the necessity for focusing, so that aiming the headlamp is the only operation required.

Dr. C. H. Sharp of the Electrical Testing Laboratories, Inc., New York, warned the engineers that road conditions must be improved or that drastic laws would be enacted to the possible injury of the automobile industry. He called attention to the testing specifications adopted by the Society of Automotive Engineers and the Illuminating Engineering Society as an example of a rational means for regulating headlights, and urged that these be adopted in all the states.

The work of the Conference of Motor Vehicle Administrators, consisting of officials from the states in the north-eastern section of the country, was described by a representative of the Motor Vehicle Department of the State of New Jersey. This conference has approved some twenty-two headlight devices in place of the 200 or more previously authorized, and has officially adopted the testing specifications referred to by Dr. Sharp. The manufacturers of motor cars were urged to cooperate in this movement by installing satisfactory devices on all new cars put on the market.

H. M. Crane called attention to the practice of dimming or cutting off the main headlights by one or both of passing drivers. The practice is dangerous, as not enough illumination is provided to permit safe passing. He did not believe dimming should be necessary if the lights were properly adjusted. This view was supported by Mr. Shanley of the New Jersey State Motor Vehicle Department. Dimming is not required by the New Jersey regulations, even in the cities.

Results of road tests made to determine the value of different grades of fuel were reported by Dr. H. C. Dickinson, research manager of the Society of Automotive Engineers. Last winter some fifty cars used for test work by manufacturers covered about 50,000 miles. Four different grades of fuel were used, varying in viscosity, under similar conditions. Similar tests had previously been made during the summer months.

These summer tests had shown the same results with the different fuels, and so the runs during the winter were made as a check. In addition to the increased consumption which was about 20 per cent for the winter operation, there was found also a slight difference (3 per cent) in consumption for the heavier fuels. This difference is small, but is considered important, in that 30 per cent more of the heavier fuels can be obtained from the crude petroleum.

The drivers of these cars favored the fuels with a low initial point even though the end points were high and more fuel required. This was pointed

out as an example of how easily driver could be fooled as regards the general performance, but a fuel that gave good starting and low initial point.

The objection to the automatic spark advance was explained by Prof. G. B. Lupton of Cornell University. He said that this was really a simpler problem than the construction of carburetors. At present the average timing error on cars is about 15 deg., which means a 10 per cent loss of fuel. This could be cured by automatic advance, a necessity particularly because modern driving is mainly acceleration and deceleration. The main objection to the use of this construction is the patent situation, according to one engineer, on account of important elements required being incorporated in separately owned patents. Another objection was that while the spark advance mechanism could be designed to work when the car was new, after it had run 5,000 miles or so, and the engine carbonized and the cylinder and rings worn, it would not work satisfactorily, so it would still be necessary to keep a spark control for the driver.

## Suggestions for Better Headlighting\*

BY R. N. FALGE AND W. C. BROWN

Engineering Department, National Lamp Works of General Electric

DESPITE the progress which has been made in the past few years in improving automobile headlights, the fact remains that on the whole conditions on the main traveled highways of the country, particularly those near large centers of population, are most unsatisfactory. The genuine concern which is apparent everywhere, the fact that state legislatures are finding it necessary to strengthen laws in an attempt to improve conditions, the very fact that this society is willing to devote an entire evening to the problem, all indicate that this matter, which has such a direct bearing on the safety of the motorist, has not been handled as effectively as others of less importance which have to do merely with road performance and repair bills.

Without question an immediate and far-reaching improvement in headlighting would result if motorists generally could be made to realize two facts:

1. That it is entirely possible to get better road illumination, and at the same time to eliminate objectionable glare by proper adjustment of the majority of headlamps now in service.
2. That the driver who makes the proper adjustments now, without waiting for others to make their adjustments, not only removes the annoyance he is causing everyone else, but also provides for himself a better, safer driving light, which makes it easier for him to pass cars with glaring headlamps.

To improve conditions the motorist should be provided with accurate equip-

ment, having simple adjustments. He should also receive instruction so clear and comprehensive that he can follow them easily, and can make intelligent allowance for such commercial variations in the equipment as affect the light distribution.

Good headlighting without objectionable glare is obtained by concentrating the rays emitted in all directions from the filament of an automobile headlight lamp into a shallow band of light having a candlepower hundreds of times greater than that of the lamp, directing it straight ahead of the car, and tilting it so that the top edge or cut-off of the beam is at the level of the headlamps. The beam should spread far enough to the sides to illuminate the ditches and turns. A low-intensity, diffused light, sufficient to reveal pedestrians, overhanging obstructions, etc., but not enough to blind approaching drivers, is desirable above the cut-off.

Engineers of the Society of Automotive Engineers, after very careful study, have found that good driving light without objectionable glare will be obtained when the candlepower directed to certain points on the road ahead of the car, as shown in the figure, falls within certain limits which they can specify. Point *A* is directly ahead of the car and at the level of the headlamps. Points *C* and *D* are glare points at the level of the approaching driver's eyes 100 ft. ahead. Point *B*, *P*, *Q* and *S* are road illumination points. When the headlamps are 36 in. above the road point *B* is 172 ft. ahead of the car; *P*, 114 ft. ahead of the car, and 6 ft. to either side of the car axis; *Q*, 57 ft. ahead and 6 ft. to either side;

\*Abstract of paper at semi-annual meeting, Society of Automotive Engineers, held June 19-23, 1923, at Spring Lake, N. J.

and S, 43 ft. ahead and 9 ft. to either side. These same points are shown in the second illustration, as they appear to the driver.

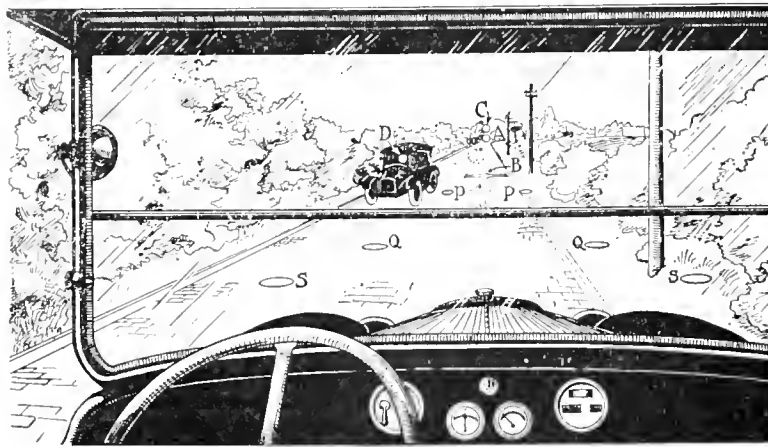
The most common type of headlighting equipment consists of a highly polished parabolic reflector using a 21-cp. gas-filled lamp in a socket which

with the distances ahead of the car to which the light is projected that satisfactory results cannot be expected with inaccurate or poorly adjusted equipment.

Given good equipment, the problem of insuring proper adjustment still remains. Greater simplicity will go a

headlamps. The light rays from the upper and lower zones tend to rise or fall as the lamp is moved, but they are deflected downward sufficiently by means of prisms so that they will not rise above the top of the beam from the middle zone when the filament is moved ahead or back of the focal point through predetermined and relatively wide limits. Incidentally the beams from reflectors which are surfaces of revolution but which are not truly parabolic in contour, will ordinarily have a sharper cut-off at the top with this lens design than with others which spread the beam.

To illuminate the roadbed most effectively, the maximum intensity should be placed as near the top of the beam as possible, where it will be projected farthest down the road. Since the eye accommodates itself rather slowly to changes in intensity, the candlepower should fall off toward the bottom and sides of the beam to illuminate the roadbed evenly and to eliminate bright spots which reduce the visibility to points beyond. To incorporate these characteristics in the lens the light in each zone has been spread and bent by different amounts. The middle zone bends the light passing through it very slightly, and the spreading effect is hardly more than is necessary to smooth up the beam. The lower prism bends the light considerably more and spreads it sufficiently to illuminate the road sides near the car and assist in making turns. The upper zone has an intermediate spread and tilt. When focused to give the best results, boundaries of the beam follow fairly closely the test stations which the S.A.E. has determined upon in specifying desirable road illumination. The design is such that there is sufficient stray light above the horizontal to illuminate pedestrians, overhanging obstructions, and similar objects.



*Points in front of car, for which headlight candlepower is specified, as they appear to the driver*

may be moved forward or backward along the reflector axis to compensate for variations in the positioning of the filament in commercial lamps; some means is provided to spread the beam to both sides and in many cases to bend it downward.

The parabolic reflector may be visualized as composed of a multitude of small flat mirrors each so placed that a light ray from one point, known as the focal point, is reflected in a direction parallel to the axis of the reflector. With all reflected rays parallel, the diameter of the beam at any distance would, of course, be the same as that of the reflector opening. With the light rays coming from any other point, the angles at which they strike would be changed, and only such as happened to be in line with the focal point would be reflected parallel to the reflector axis.

The filament of an automobile lamp must have some size, and it cannot, therefore, all be exactly at the focal point. Rays which come from points on the filament not at the focal point are not reflected exactly parallel to the reflector axis. The farther from the point they happen to be, the more they diverge. Actually, an image of the filament is reflected from every point on the reflector. These filament images increase in size with distance and at 20 or 30 ft. ahead of the car, when the filament is properly placed about the focal point, they overlap and intermingle in such a manner as to produce a fairly uniform intensity over the cross-section of the beam.

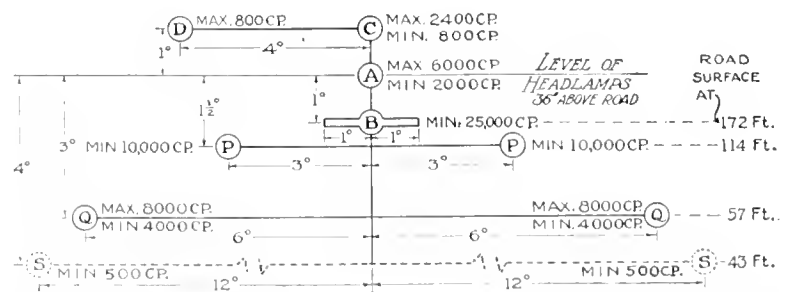
It is evident from this discussion of the fundamental principles underlying the operation of the headlamp that it is a very sensitive device. The distances from the filament to the reflector and lens are so very short as compared

long way toward its solution. Proper adjustment of all devices in general use today necessitates both focusing and aiming. It appears impossible to eliminate the aiming adjustment. To design redirecting equipment which will eliminate the focusing adjustment is both possible and practicable.

#### LENS TO ELIMINATE FOCUSING

A lens which with accurate equipment will compensate for commercial variations in filament positioning in the lamp, and at the same time distribute the light effectively in the beam, has recently been designed.

It takes advantage of the fact that



*Diagram of test positions showing candlepowers recommended by S.A.E.*

rays reflected from a parabolic surface converge or diverge as the light source is moved ahead or back of the focal point. The light rays which pass through the middle zone are tilted downward slightly, and from the upper part of the beam. As the filament is moved ahead or back, the rays in this zone converge and diverge laterally, and maintain the top, or cut-off, of the beam at substantially the level of the

This lens can be designed to compensate for variations in filament positioning within the commercial limits ordinarily accepted in lamp manufacture. The distribution of light becomes less desirable as the tolerances are increased. The most satisfactory compromise between light distribution and accuracy in lamp assembly appears to result when the lens is designed to compensate for variations of  $\frac{3}{4}$  in. ahead

or back of focus, or, in other words, the tolerances to which tipless precision lamps are now being manufactured.

The permissible axial variations of  $\frac{1}{8}$  in., to which these same tipless precision lamps are manufactured, are also acceptable. Axial variations tend mainly to raise or lower the entire beam without serious distortion. They may be compensated for with very fair success by aiming the headlamps.

Lamps should be uniform and efficient in performance throughout life. They should have highly concentrated filaments to give minimum beam divergence. The filaments should be positioned accurately with respect to the locking pins and to the axis of the base to minimize beam distortion. They should not sag in service.

Sockets should grip bases firmly and fit reflector sleeves closely so that lamps will not be jarred out of adjustment as the vehicle passes over rough spots on the road. Socket and reflector axes should coincide. Electrical resistances at the contacts should be low to minimize losses in light.

Reflectors should be highly efficient and not warp or tarnish in service. Inaccurate contour causes glare and unsatisfactory road illumination.

Lenses should be free from hills and hollows caused by careless polishing of glass moulds. Their design should be based on sound engineering principles.

Doors should be easy to remove and to replace. Means should be provided to prevent the lens from rotating.

Universal mountings should be provided to facilitate aiming. The importance of proper aiming cannot be over-emphasized.

The fact that a few of the parts manufacturers are able to furnish equipment which will meet most of the requirements discussed above at little if any increase in price is proof that it is today commercially possible and practicable to attain the required standards of accuracy. Satisfactory performance is, however, unquestionably of sufficient importance to justify where necessary a small additional cost for thoroughly satisfactory equipment.

The use of devices which eliminate the necessity for focusing and leave to the motorist only the simpler adjustment of aiming, should increase the number of cars on the road with headlamps properly adjusted and should assist materially in regaining the co-operation of car owners in improving headlighting conditions throughout the country.

### Federal-Aid Highway System Explained by Wallace

AT THE annual meeting of the American Automobile Association, held on May 22 in New York, the Secretary of the United States Department of Agriculture, the Hon. Henry C. Wallace, said that at the end of the summer about 179,000 miles will have been designated as part of the federal-aid highway system. All but three states have submitted tentative systems

for approval. On March 31, 21,338 miles had been completed at a total cost of \$378,000,000, and the federal share of this cost, amounting to \$161,000,000, approximately, had been paid to the states. The total mileage completed or under construction on March 31 was nearly 40,000, the difference being made up of about 3,500 miles completed but not finally accepted by the government, and some 14,000 miles under construction.

When the system is completed, one will be able to travel from any town of 5,000 population, or greater, to any other town of the same population, without leaving an improved road. A study of typical states in the East, Middle West and West, shows clearly that the federal-aid roads will give a maximum of service. In Maryland, said the Secretary, not more than 23 per cent of the population lives further than 10 miles from a federal-aid road; in Indiana less than 1 per cent; in Arizona, where the total population is but 334,000, perhaps one-third will live outside of the 10-mile zone. In designating these routes, the chief aim of the states and the federal government has been to select routes which will give the maximum local service, and at the same time connect with one another to form a great national highway system.

### Railroad Men as Transport Managers

AS A RESULT of a survey of the highway transportation field, Alfred Reeves, general manager National Automobile Chamber of Commerce, believes that railroad men as experts on transportation, are the proper ones to manage highway transportation, particularly as it can be made an addition and a feeder for rail lines.

This opinion was expressed by Mr. Reeves in a talk given on Feb. 5 before the Transportation Club of Detroit, Mich. An abstract of Mr. Reeves' remarks follows:

While the truck has benefited many, it may have taken some traffic from the railroad, but as it has been of a short-haul character on which the railroads claim they do not make money, this has been something of a blessing.

Railroad men are not certain of the proper distance for profitable truck haul, their opinions ranging from 25 to 150 miles. The truck will take the place of many short-haul railroads. More than two-thirds of the 649 railroads in the Short Line Association, are listed as having less than 25 miles of track, which under the new order of things means that they will have difficulty in competing with the motor truck.

Everywhere we find railroads, trolley lines, and even the Chicago "L" adding trucks and buses to their equipment.

Bus and truck lines have not all been successful, generally because of mismanagement or because of routes that furnish insufficient returns. All this means that the railroad men are the proper ones to take charge of truck and

bus operation, making them feeders to the trolley and steam line. Thus will be assured more freight and passengers for the big rail, which would more than offset any revenue that may be lost through the motor rail.

### Educational Work to Be Started by Simplified Practice Committee

AF A meeting of the American Automobile Association, held on June 14th in New York, the following were discussed for a committee to campaign to educate the five contact groups represented at the meeting. These consist of the consumer group, the service or garage group, the sales or dealer group, and the producer or manufacturer group.

It is hoped in this work to educate the general standardization movement, show how standards are formulated and used, and explain why they are of value to the different groups. This will help to make known the fundamental purpose of the committee, which is to bring about the greater use of the standards already established in the automotive industry, and to assist in determining whether they should be revised so as to be more widely used by the manufacturer.

The committee reported at the May meeting to study the status of radiator cap standardization reported that a large part of the production is confined to three or four sizes, each of 100,000 radiator caps. This work will be given further study.

As a new technical committee to investigate the extent to which SAE standards for lamp mounting are used. A subcommittee was appointed to report on this subject at the next meeting, which will be held at some time after the middle of September.

### Selling Motor Transportation Through Advertising

SPEAKING at the American Automobile Advertising Convention, June 14, George M. Graham, vice president of the Chandler Motor Car Company, Cleveland, said:

"Within the industry there are four outstanding problems brought about by the constantly increasing use of the automobile:

"First, we must finance and expand our highway systems to take care of a volume of traffic which is fast outstripping their capacity.

"Second, tax and license charges against motor transportation must be so restrained that while adequate, they be not restrictive or punitive.

"Third, motor transportation must be fitted into its proper relationship with other mediums of transportation, so that the economic needs of the public can best be served.

"Fourth, a way must be formed to curtail the number of accidents and fatalities chargeable to the automobile."



# News of the Road

From wherever the bus runs, are brought together the important events, here presented to show the movements of the day.



## Buses Downtown

**Expert Advocates Exclusive Use of Auto in Chicago's Congested Loop District.**

PUTTING all surface cars and elevated railroad trains in subways in Chicago's Loop district and permitting only motor buses as a means of public transportation in the downtown district is advocated by John A. Ritchie, president Chicago Motor Coach Company, after a year's study of the local transportation problem.

Mr. Ritchie's recommendations are contained in a report which he made public late in June which supports the subway terminal recommendations made by the 1916 city's traction and subway commission. It also embodies developments in motor bus transportation based on his experience with the operation of the Fifth Avenue Coach Company, New York, and the more recent inauguration of bus transportation in Chicago.

Mr. Ritchie in his plan divides the city and its environs for the purposes of transportation into five sections: A central business district; an inner residential district within 5 miles of the Loop; an outer residential district, between 5 and 10 miles from the Loop; South Chicago; and the suburbs.

He points out that Chicago is restricted in growth to one-half the sweep of a circle, due to Lake Michigan, and requires traveling 40 per cent greater distances from its center than other cities. The average ride, Mr. Ritchie says, is nearly one-half again as long as in cities where expansion may be in all directions. In addition, he points out that approach to the business center is restricted by railroads and the Chicago River.

"Beyond the 5-mile limit the time saving by elevated and subway lines becomes so great as compared with surface lines that within this territory the bulk of the serious or business travel will naturally go to the elevated and subway lines," says Mr. Ritchie. "It is generally conceded that within the inner residential district the major part of the traffic is most efficiently handled by surface facilities, and this means motor bus as well as electric car hauling."

"Below a certain number of passengers by the mile-route-year, the motor bus has an economic advantage over the surface railway. Improvements in buses in the future will undoubtedly operate to enlarge their field and reduce that of electric cars outside the more densely populated areas."

To preserve the usefulness of surface car lines, he declares that subways must be built through the central business district. These, he asserts, will leave the Loop streets clear of fixed track traffic, eliminate delays and save fully 15 per cent in time from the 4-mile circle to the center and 30 per cent from the 2-mile circle.

Mr. Ritchie declared that a \$4 investment is required by a surface electric railway for every dollar of gross revenue, but only \$1.25 of investment is required in the case of motor bus service.

"It is easier to raise money on this basis," he continued, "and the amount placed at the hazard of the business is less. The major part of an investment in a motor coach system is in the coaches themselves, and they would be practically as useful in one place as another in case of foreclosure or other reasons for removal and the garages and equipment are suitable for public use."

## President Harding's Views on Transport Evolution

*Extract from President's Speech at Kansas City on June 22*

We have not fully appraised the evolution from the ox cart to motor age. The automobile and motor truck have made greater inroads on railway revenues than the electric lines with their intimate appeal to the local community. There will never be a backward step in motor transportation. But we shall do better if we find a plan to co-ordinate this service with the railways, rather than encourage destructive competition.

Indeed, the motor transport already promises relief to our congested terminals through better co-ordination. We have come to the point where we need all the statecraft in business to find the way of making transportation in its varied forms adequate to the requirements of American commerce, to afford that transportation its due reward for service, without taking from production and trade a hindering exaction.

I cannot too greatly stress the importance of this great problem. It cannot be solved by those who commend the policy of confiscation or destruction, nor can it be solved by those who make a prejudiced appeal for political favor. We must frankly recognize the exactions imposed upon the American farmer during the war expansion of rates, take note of the wage development which will yield no reduction in the principal item of operating cost, and seek conditions under which we may have the requisite reductions in fixed charges which will afford encouraging relief.

If the system consolidations, with diminished overhead costs, with terminal advantages largely improved and terminal charges greatly reduced, will not afford the solution, then our failure will enforce a costlier experiment and the one great commitment which I hope the United States will forever escape.

## St. Louis Line Popular

**New Service in Mound City Attracting 100,000 Riders a Week With Only Twenty Vehicles in Use.**

THE success of the People's Motor Bus Company, St. Louis, appears to be assured. The twenty buses now operating in the Delmar Boulevard service between University City and Eads Bridge are carrying upward of 100,000 passengers per week and the number is increasing daily.

On May 29, the first day the buses were in use, 13,000 passengers rode the buses, and the next day the total jumped to 15,000, and finally to the average of 100,000 per week. This patronage was far in excess of the early estimates made by the company officials.

Eventually the company will have two hundred or more buses in St. Louis and vicinity. As soon as the Delmar-Washington service is put on a three-minute basis the cross-town line along Grand Boulevard will be opened. This is regarded as the most important step to be taken, as it will open up sections of the city which do not have street car facilities.

"St. Louis is the best bus city in the United States," said Richard W. Meade, president and general manager, in discussing the future of his company. "We have never received a more wholehearted welcome from city officials and the general public than we have here."

An indication of this attitude occurred the first day buses were operated. Officials of the company found a man placing large bouquets of carnations, roses and peonies on each bus at Eads Bridge. They bore a card which read: "Welcome to St. Louis. Grimm & Gorly." Upon inquiry, they were informed by officials of the floral firm that they were so pleased with the fact that the buses were being operated on Washington Boulevard in front of their store they wished to show their appreciation by saying it with flowers.

Another instance indicated this same feeling on the day that the People's Motor Bus Company opened its service in University City, the initial line. R. Fielding, president and director-general of the General Film Manufacturing Company, a \$600,000 motion picture production company, communicated with Mr. Meade in substance as follows:

"I noticed that your motor buses after discharging their loads circle in front of our studios. I want to suggest that if your drivers will stop in



front of our plant and announce that it is the General Film Manufacturing Company's studios, we will reciprocate by informing every one coming to our studios to ride the motor buses which stop in front of our doors."

Mr. Meade readily accepted the offer, and, needless to say, both organizations have benefited through this teamwork. The General Film Manufacturing Company is just entering upon its production activities and it is a decided advantage to the motor bus line to have every one going to the studios use the buses, and at the same time the General Film Manufacturing Company is aided by the bus service and the advertising derived from the announcements of the drivers.

On June 7 the company changed its route for the Municipal Opera service further to facilitate the handling of traffic. Originally the buses in this service operated from Grand and Lindell Boulevard westward over Lindell Boulevard and Forest Park roads to the Open Air Theater, Forest Park, where the opera is held.

Under the new plan after 6 p.m. every second bus on the Delmar-Washington Boulevard service turns at De-

Ground for the People's Motor Bus Company's new garage and assembly plant in Dover Park, on Grand Boulevard near Carondelet Park, was broken on June 14. Joseph L. Rhinock and E. S. Sims, two of the principal stockholders in the company, were present.

While in town they were the guests of Mayor Henry W. Kiel on an automobile tour of the city. Both were enthusiastic about the bus outlook in St. Louis. The company will also have a garage on Delmar Boulevard and eventually another one in the downtown district.

## Railways Perfecting Bus Plans

Los Angeles Service to Start Soon—New Jersey Company to Operate in Camden—Mr. Mitten Promises Philadelphia Some Surprises—Many Other Projects Making

A VERITABLE motley of news confronts the commentator dealing this month with events having to do with the operation of buses by the electric railways. There have been no events within the last few weeks quite so significant, perhaps, as those recorded in BUS TRANSPORTATION last month and having to do with the extensive use of buses by the railway in Los Angeles and with the opening of de luxe service in Milwaukee, but the more recent events have varied in degree rather than in kind from those recorded in recent issues. After all, the

operation of double-deck motor buses on Sunset Boulevard throughout the entire length of Hollywood, this service will be started as soon as a desirable type of bus has been developed. It will possibly be Oct. 1, however, before this service is established. The new bus for use in Los Angeles will be soon disclosed.

Next in importance, perhaps, to the news from Los Angeles is that coming from Camden, N. J., in which city the Public Service Railway operates. It is planned beginning on July 2 that the Public Service Transportation Company, a subsidiary of the Public Service Corporation of New Jersey, will operate a fleet of modern motor buses on Kaighn Avenue and in the Parkside district of Camden. At the same time, street car service on the present Kaighn Avenue line will be discontinued.

The buses will be routed from the Kaighn Avenue ferry easterly on Kaighn Avenue to the Boulevard, thence north along the Boulevard to Baird Avenue, thence returning to Kaighn Avenue by way of Baird Avenue and then to the starting point. The part of the route east of Kaighn Avenue is new and provides service to a district not before served. For a part of the distance, it runs along Forest Hill Park and in addition gives easy access to the Camden High and Junior High Schools.

Eight buses will be operated on this line. The equipment used will be White Model 50 chassis and Hoover bodies. Buses will be operated on a five-minute headway during the rush hours and a seven-and-one-half-minute headway during the other hours. Connection is made at the Kaighn Avenue ferry with both the Philadelphia & Reading Railroad operating to and from Philadelphia and with the Philadelphia & Reading train to and from Atlantic City and other New Jersey points.

The rate of fare will be 8 cents, four tokens for 30 cents, and tokens sold by the Public Service Railway will be honored. Upon payment of 1 cent additional transfers will be issued to intersecting lines of the Public Service Company and transfers will be issued by the railway to the buses at the same charge.

Over in Philadelphia T. E. Mitten, chairman of the board of the Philadelphia Rapid Transit Company, is promising Philadelphians the finest bus service in America on Roosevelt Boulevard.



*This illustration shows that the new St. Louis buses are popular*

Balivere Avenue and runs southward to Forest Park and thence to the theater. These buses only run as far east as Grand Boulevard. Under this plan opera patrons using street cars can avoid the walk through the park, while the regular bus service does not suffer.

The company officers have also had many requests for buses for private outings, but because of the fact that the company has only about half the number of buses needed for its Delmar-Washington service alone all such requests have had to be declined with thanks. The company later, however, plans to make the handling of private outings, etc., a distinct feature of its service.

Los Angeles proposal still remains the most important recent event of its kind from the standpoint of news. In this connection it is interesting to note that the Board of Public Utilities has established Aug. 15 as the date for commencement of crosstown bus service on Western Avenue, Los Angeles. Eighteen single-deck buses are to be installed as the first quota of this new service. They will be jointly operated by the Pacific Electric Railway and the Los Angeles Railway, on a five- and ten-minute schedule. The buses will issue transfers to and from the street cars of the two local railways at points where the buses on Western Avenue intersect the two systems. As for the

His application for operating rights is already before the local and state authorities and recently a trial run was made with the new buses which Mr. Mitten intends to put in service.

It now appears that there is a strong probability that the proposed crosstown trackless trolley line to be operated by the Rochester Co-ordinated Bus Lines, Inc., a subsidiary of the New York State Railways, may be abandoned.

Considerable opposition developed at a Council hearing on the plan held on June 22. Residents of some of the streets to be traversed by the line objected to the use of trackless trolleys. There was a decided sentiment for crosstown service, but the use of motor buses instead of trackless trolleys was suggested. The railway takes the stand that if the people of the section covered by the proposed line object to it the plan will be abandoned. The decision to install the route came after continued agitation for crosstown service. The railroad committee of the Council has the matter under advisement and will report soon. It was intended to use on this route five trackless trolleys made by the Brockway Motor Truck Company and equipped with General Electric apparatus.

Electric railway service in Spartanburg, S. C., will be discontinued on July 23 under order of the South Carolina Railroad Commission. Service on three lines, the Clifton, Glendale and Saxon, is to be maintained, provided a system of buses is started to connect with the cars operated. The lines mentioned connect Spartanburg with the suburbs. The failure of the Spartanburg company to earn revenue sufficient to meet operating expenses is given by the Railroad Commission as the reason for its action in issuing its order. The railway system in Spartanburg has passed through many vicissitudes. Service on the lines was discontinued on Dec. 31, 1922, and in January, 1923, the Railroad Commission took over the property and since that time the commission, according to its chairman, F. W. Shealy, "has resorted to every known means of stimulating traffic that the company might be placed upon its feet."

Residents of Highland addition, Moline, will be provided with motor bus transportation as soon as the Twenty-third Avenue pavement is completed. An order for the bus service was issued by the Illinois Commerce Commission after P. R. Ingelson, city attorney, had presented the local situation to the commission members in Chicago. A certificate of convenience and necessity is now being prepared by the state board and will be issued to the Tri-City Railway to legalize operation of the bus line.

Six luxurious buses seating twenty-five persons and costing \$8,500 each have been purchased by the Des Moines City Railway, which will use them as feeders for the traction lines in territory in which it is believed that an ex-

tension of the car lines would prove unprofitable. The buses are on White chassis, the body made by George Kneeser of the Champion Auto Equipment Company, Hammond, Ind.

On the other hand a piece of negative news is contained in the refusal of the International Railway, Buffalo, to accept the franchise offered by the City Council giving it permission to operate a bus line in Bailey Avenue on a 7-cent fare or four tokens for 25 cents with free transfers to connecting traction lines. The company said it could not operate the line at a profit unless the city granted the Delaware Avenue franchise at the same time. The Delaware Avenue franchise sought by the company would allow a 10-cent fare with a 2 or 3-cent transfer charge. The Bailey Avenue line would supply service where there are now no trolley lines, while the Delaware Avenue route would merely supplement the traction service in that section of the city.

Other significant news briefly summarized follows:

The trustees of the Eastern Massachusetts Street Railway have arranged to take over the Woburn-Reading Bus Line Company, Inc. The Woburn West Side route, Woburn-Burlington-Billerica line, Stoneham-Reading-Wakefield line, the Woburn to Montrose route and the Woburn-Wilmington route are all embraced in the transfer to the railway. The railway has purchased the John F. Lovell Bus Line provisionally on the terms that the towns grant the railway the right to operate.

The six Model 50 White chassis with Bender street car type bodies recently purchased for operation in Louisville, Ky., by the Kentucky Transportation Company were shipped from Cleveland on June 18. This company is a subsidiary of the Louisville Railway.

The Shore Line Electric Railway, New London, Conn., will add two more Fageol buses to its fleet, making four in all.

The Springfield (Mo.) Traction Company has established a new bus line in that city to serve residents on Sunshine Lane and South Kimbrough.

A bus service that will link up with the trolleys of the Morris County Traction Company has been authorized by the Board of Aldermen of Dover, N. J., on application of William R. Schultz, Morristown, son of Otto G. Schultz, secretary and treasurer of the traction company. The buses will transfer to and from the cars of the traction company. The fare will be 7 cents, the same as the trolleys.

The Capital Traction Company, Washington, D. C., has been granted permission to operate a crosstown bus connecting northeast and southwest Washington. The fare is to be 8 cents cash, six tokens for 40 cents, with a 2-cent transfer to other lines operated by the company.

The Elmira Water, Light & Railroad Company, Elmira, N. Y., has been granted permission to operate a bus

line from Watkins through the streets of Elmira if the trolley line is abandoned.

Mayor Charles W. Power of Pittsfield, Mass., has refused to grant any more jitney licenses and is in favor of giving the Berkshire Street Railway an opportunity to make good by improved service. The railway, feeling the opposition of the Dalton bus line operated by Emil Tremblay, offered to buy him out through arbitration, but no agreement could be made.

The Tama & Toledo Railroad, Toledo, Iowa, is reported to have purchased the Tama-Toledo Bus Line from Joseph Dolash. It is said that the bus line will hereafter be operated by the railroad in connection with its electric railway.

The Kentucky Carriers, Inc., a \$200,000 subsidiary of the Louisville Railway, started service on Third Avenue on June 24, using four single deck buses, each seating twenty-six people, to be maintained under a ten-minute schedule, under a 10-cent fare, on a route from Main Street to the Confederate Monument, a distance of twenty blocks. Twelve, two-man, double-deck buses will be placed in operation some time in September.

The Grand Rapids Railway has put into service four of the six type J Fifth Avenue Coaches purchased recently to augment its present railway service under the new franchise granted about a year ago. It is felt that the new bus service will fill the existing gap from the outskirts of the city, through the residential district to the heart of the city. Fares are the same as on all the railway lines and transfers are issued exactly as on the city street cars. The rate is 10 cents a single ride, with seven tickets sold for 50 cents.

### Eleven Lines to Meet at Cleveland Terminal

Cleveland is to get a new terminal known as the "Union Motor Stage Terminal," located on the north side of Bolivar Road near East Ninth Street, with entrances on both Bolivar Road and Ninth Street. It has been leased by the Cleveland-Akron Bus Company, but will be available to all lines that operate out of Cleveland. Invitation has been extended to all lines to use the terminal and most of the companies invited have signified intention of accepting the offer.

The following motor bus lines are expected to use the new central stage station when it is completed about the middle of July:

- Cleveland-Akron line.
- Cleveland-Warren-Youngstown line.
- Cleveland-Ravenna line.
- Cleveland-Ashtabula-Conneaut line.
- Cleveland-Sandusky-Toledo line.
- Cleveland-Medina line.
- Cadillac Bus Company, Warren.
- Northern Transit Company, Akron.
- Cleveland-Elyria line.
- Cleveland-Lorain line.
- Cleveland-Berea line.

## British Bus News Summarized

**Rivalry Growing in London Bus Field—New Operators Become a Menace by Their Tactics—Member of Parliament Sees Doom of Tramcar—Motorway Proposed**

THE old days of bus competition in the streets of London, with the concomitants of racing and cutting in, threaten to return, for many small companies and even private firms are putting on vehicles to compete with the London General Omnibus Company and associates with which it has working agreements. In the House of Commons on May 29 G. Lasker-Lampson, Under Secretary for Home Affairs, said he was informed by the Commissioner of Metropolitan Police that special instructions had been issued to the police with a view to detecting offenses arising out of the rivalry between buses traversing the same routes. There had been several prosecutions in which fines were inflicted, and other similar cases were pending. The commissioner had also sent a letter to all bus proprietors calling attention to the danger of racing by drivers, and requesting them to warn employees.

Lord Ashfield, chairman of the London General Omnibus Company, had slightly anticipated the raising of the subject in Parliament, for on May 28 he issued a letter to the press in which he said that the drivers in his company's employ were discharging their duties admirably under considerable provocation and in difficult circumstances. They were restrained by a discipline and experience of traffic extending over many years. The company and its employees were meeting competition in a fair and legitimate manner. They were not interested in obstructing their rivals. They intended operating the bus services in an orderly and systematic way, as part of a well-considered and complete scheme of transport for Greater London.

The number of small bus-operating firms in London continues to increase, and while it is not easy to see how they can compete successfully with the London General Omnibus Company, still hope springs eternal in the human breast. At the time of writing a movement has begun among these small owners to form a protection and trading association. Such an association would be a mouthpiece for voicing the views of its members to the local authorities and the government and also a trading organization for obtaining cheap supplies.

Another outbreak of activity comes from the London General Omnibus Company which should help to popularize some of the beautiful stretches of the River Thames above London. Arrangements have been made with J. Mears, Launches & Motors, Ltd., Richmond, by which a combined bus and boat ticket is being issued from Richmond to Chertsey Bridge, available on the forward journey by bus and returning by boat leaving Chertsey Bridge at 4.45 p.m. Similarly tickets are being issued

by the boat leaving Richmond Pier at 11 a.m. for Chertsey Bridge, available for return by omnibus to Richmond. This arrangement went into effect on June 4.

G. H. Hume, a member of the London County Council and of Parliament, speaking in the House of Commons recently, said that if a bus could come anywhere near the carrying capacity of a tramcar, the doom of the latter in large cities would be sealed. Mr. Hume was formerly chairman of the highway committee of London County Council, which has charge of the Council's tramway undertaking.

### ANOTHER GARAGE FOR L. G. O.

A fresh example of London General Omnibus Company developments is to be found in the construction of a new garage at Sutton, some miles beyond the southern fringe of the metropolis. With an area of 37,000 sq. ft. it will provide accommodation for 100 buses at a cost of £30,000. A 13,000-gal. petrol tank will be installed. A new arrangement has been made by the company under which increased facilities have been provided for conveying people to and from the local railway stations.

On Whitmonday the London General Omnibus Company carried 3,500,000 passengers. This, of course, was practically all holiday traffic. The buses running out to the country round were specially well patronized.

The number of American visitors to Britain seems to be unusually large this year. One of their activities is to take part in the motor coach tours organized by the London General Omnibus Company. It is reported that arrangements have been made whereby seats for these tours may be booked in New York and other large cities in the United States. In early summer especially the country round London is exceedingly beautiful, and the coach tours give a fine opportunity for seeing it.

A proposal is on foot to construct a motorway from London to Liverpool, with a branch to Oldham, a total length of 226 miles. What is called the Northern & Western Motorway Syndicate has been formed to promote a bill in Parliament to authorize the work. The bill cannot be passed till next year, but if it is passed a start will then be made to raise the capital and proceed with the work of construction. For the latter about two years will be required. The projected road will be for the exclusive use of motor vehicles, and provision will be made both for passenger and light goods traffic traveling at high speed and for heavy goods traffic at lower speed. An initial width of 50 ft. is proposed, but provision will be made for widening if required, and also for the erection of factories, warehouses, repair shops, garages, etc. The revenue

will be derived from tolls levied on users of the motorway. It is estimated that they will be sufficient to meet the cost of the road, and that there will be a surplus which will be available for other purposes.

A curious case has arisen at Hull. The Hull Corporation asked for sanction to run a bus line in a district called Hessle. After a preliminary inquiry there was a meeting of the proprietors of other bus lines, a railway and from the Hull and Hessle. The Ministry of Transport then refused sanction. The Town Council, evidently not anticipating such a decision, had purchased a garage for £8,000, of which £4,500 was for the vehicles and £3,500 for good will. If the Ministry does not reverse its decision, the Council will have to try to sell the service. The incident seems to form part of a movement in various towns of which complaint is made by private enterprise. Bus companies and firms continue to allege that they are being refused licenses by municipalities which run tramways or buses, and that even when licenses are granted the conditions are frequently onerous, while sometimes the local authority puts on buses to compete with those privately owned.

### Bus vs. Railway via Radio

Harry L. Brown, editor of *Electric Railway Journal*, is scheduled to talk on Saturday evening, Aug. 11, from 7:15 to 8:00 p.m. from Aeolian Hall, New York, to a radio audience. His subject will be: "Is the Electric Railway a Back Number and Can the Bus Replace It?"

Mr. Brown is an authority on the subject and it undoubtedly will prove interesting to bus men who are also radio fans to learn Mr. Brown's ideas with regard to the future of the bus.

### \$400,000 Expenditure by City Enjoined

Supreme Court Justice Wasservogel in the suit of William J. Schieffelin has decided against Commissioner Whalen and other city officials of New York restraining the use of the city funds in establishing a trackless trolley line on Pelham Bay Parkway to City Island. The city expected to use about \$100,000 in the preliminary work and nearly \$5,000,000 to complete the line. Mr. Schieffelin brought suit as a taxpayer to prevent the use of city money for an unauthorized purpose. The court opinion said, in part:

"There is no authority for the operation by the city of the proposed trackless trolley system. In the brief submitted by the Corporation, counsel it is conceded that the question of law involved are the same as those involved in *Schafer vs. City of New York*, wherein the Appellate Division has just affirmed a judgment rendered by Mr. Justice Mullan enjoining the city from appropriating municipal funds for the purchase and operation of motor omnibuses."

## Buffalo Mayor Issues Emergency Bus Permits

Mayor Frank X. Schwab of Buffalo, N. Y., has declared an emergency exists in the transportation of passengers in Bailey Avenue, and in Delaware Avenue, and has issued permits for the operation of bus lines in these two streets. The VanDyke Transportation Lines, Inc., has started the operation of a fleet of single-deck buses on a 10-cent fare in Bailey Avenue.

Montana Brothers, who operate the Yellow Cab line in Buffalo and also a fleet of buses between Buffalo and Niagara Falls, have promised Mayor Schwab that they would install a fleet of motor buses in Delaware Avenue at once on a 10-cent fare.

Henry W. Killeen, counsel for the International Railway Company, says he will carry the bus line fight into the courts for an injunction restraining the Mayor from issuing bus operating permits in competition with the local railway.

In issuing permits for the operation of motor buses in Buffalo, Mayor Schwab says that under the law he can issue such permits when an emergency exists, such as a car strike or whenever the local traction company does not give adequate service. It is the Mayor's belief that adequate service is not now being given to residents along Bailey Avenue, or Delaware Avenue, at a 7-cent fare or four tokens for 25 cents, but it was rejected because the company's application was contingent upon receiving a franchise for buses in Delaware Avenue at a 10-cent fare and a 3-cent transfer charge from the trolleys. The company planned to run the 7-cent buses in Bailey Avenue, because it is unable to provide traction service through the street, and the buses would be considered part of the regular surface lines of Buffalo. The 10-cent Delaware Avenue buses would be considered an auxiliary service and would parallel established routes of the International.

## New Grant for Saginaw

Electors of Saginaw, Mich., voted on June 25 on an amended car-bus franchise for the defunct Saginaw-Bay City Railway. It is almost two years since Saginaw has had car service, and all attempts made in the meantime to restore electric railway service with motor bus extensions have failed. Since the election on April 2 a new Mayor and two Councilmen chosen on a platform to restore responsible transportation service have taken the lead in preparing a contract which has several modifications over the previous grants. The present contract calls for a grant of fifteen years with a 10-cent cash fare and four tickets for 25 cents. The grant rules that before motor buses are purchased the specification must be given the Council for approval. The vote in favor of the new grant was more than three to one.

## Tabular Presentation of Recent Bus Developments

Permits Granted		
Company	Address	Route
John Burke	Paterson, N. J.	Paterson to Riverdale, N. J.
James Farrell	Paterson, N. J.	Paterson to Riverdale, N. J.
East Washington Heights B.R.	Washington, B. C.	Penn. Ave. to Randle Highlands
Tri State Motor Exp	Keokuk, (Iowa)	Medill, Alexandria
M. C. Griffin	Middletown, N. Y., Erie Station	Liberty, N. Y., to Middletown
Mountain Bus Co	Liberty, N. Y.	Liberty to Monticello, N. Y.
Jeffersonville Transport Co.	Jeffersonville, N. Y.	Jeffersonville to Liberty, N. Y.
Chas. Bellinger	Roscoe, N. Y.	Roscoe, N. Y., to Liberty
Meola & Meola	Middletown, N. Y.	No. White Lake to Liberty, N. Y.
Walker & Schatzel	Connelly, N. Y.	Kingston to Connelly, N. Y.
John Fabia	White Plains, N. Y.	Tarrytown, N. Y., to Mount Kisco
Walter Wagner	Hornell, N. Y.	Bath to Hornell, N. Y.
Claude Mann	Geneva, N. Y.	Geneva, N. Y., to Auburn
Lakeview Transit Co.	Toledo, Ohio	Oak Harbor to Locust Pt., O.
Ellington Transit Corp.	Ellington, N. Y.	Jamesstown to Ellington
Geneseo-Rock Island Bus Co.	Rock Island, Ill.	Geneseo to Rock Island, Ill.
Isadore Ackerman	E. Brandy, Ky.	East Brandy to Kaylor, Ky.
Albany-Castleton Bus Line		Albany Streets
F. N. Carpenter		Niagara to No. Tonawanda, N. Y.
G. Spooner	Castleton, Vt.	Whitehall Sts. to Rutland, Vt.
F. N. Carpenter	No. Tonawanda, N. Y.	No. Tonawanda Streets
Raymond K. Adams		Huntington & Swab, Pa.
Herman Meier	Verona, Wis.	Madison-New Glarus, Wis.
United Stage, Inc.		White Water & Indio, Cal.
Boulevard Transit Co.		Streets of Omaha, Neb.
Southern Ill. Bus Co.		Mt. Vernon-Cabool, Ill.
Southern Ill. Bus Co.		Benton-Johnson City, Ill.
Southern Ill. Bus Co.		Benton-Christopher, Ill.
Southern Ill. Bus Co.		West Frankfort, Ill., to Herrin
Geneseo-Rock Island Bus Co.		Geneseo to Rock Island, Ill.
M. C. Jurgemeyer	Kaukauna	Appleton-Kaukauna, Wis.
Yellow-Motor Bus Co.	Winneconne, Wis.	Oshkosh, Wis., to Princeton
Fred J. Delair	Tupper Lake, N. Y.	Tupper Lake to Saranac Lake
Wm. Marshall	Millport, N. Y.	Watkins to Elmira, N. Y.
Chas. Mable Scott	Rushville, N. Y.	Canandaigua to Naples, N. Y.
Ingalls Bus Line	Olean, N. Y.	Cuba to Olean, N. Y.
Carl R. Long & C. R. Schneider		Dunkirk, N. Y., Streets
Walter Wagoner		Hornell to Hammondsport, N. Y.
J. B. Owen	Camden, N. J.	Camden to Paulsboro, N. J.
H. F. Brewer	Turnersville, N. J.	Camden to Turnersville, N. J.
L. J. Steiner		Bellmore to East Meadow, N. Y.
Collins Taxi Co.	Pittsfield, Mass.	Square to Pontoosuck Lake
Lines Started		
Peoples Motor Bus Co.	St. Louis, Mo.	Eads Bridge to University City, Mo.
Independent Bus Line	Memphis, Tenn.	Memphis to Raleigh
James Livesley	New Bedford, Mass.	Horseneck, Mass., to New Bedford
Leo Heyn	Summit, Penn.	Uniontown, Penn., to Summit
Chicago Motor Coach	Chicago, Ill.	South Side Route
Coeur d'Alene	Hayden Lake	Coeur d'Alene to Hayden Lake, Wash.
E. N. Corwin	Newburgh, N. Y.	Middletown to Goshen, N. Y.
H. Clay Fisher	Nyack, N. Y.	Suffern to Sparkill, N. Y.
George D. Stedle	Riverton, N. J.	Riverton-Frankford, N. J.
Terminal Bus Co.	St. Paul, Minn.	Twin Lake City-St. Paul, Minn.
Devans & Wiener	Thumb, Mich.	Bay City to Thumb, Mich.
Lakeview Transit Co.	Port Clinton, O.	Port Clinton-Toledo, Ohio
Cannonball Trans. Co.	Portsmouth, O.	Portsmouth to Chesapeake, O.
McDevitt Bros	Greensburg, Pa.	Greensburg-Blairsville, Pa.
S. Jones & W. Leech	Gorham	Canandaigua-Penn Yan, N. Y.
Dresner Bros	East St. Louis, Ill.	E. St. Louis to St. Louis, Mo.
Peoria Bus Line	Peoria, Ill.	Peoria to Galesburg, Ill.
City Bus Line	Morgantown, W. Va.	City Streets
Shawneetown Marion Bus Co.	Marion, Ill.	Harrisburgh-Marion, Ill.
Marion & Harrisburg Bus Line Co.		Harrisburg, Paulton, Ill.
H. W. Powell		Honston, Tex., to Rosenberg, Tex.
Hudson Transit Co.	Sparkhill, N. Y.	Bear Mountain to Sparkhill, N. Y.
Park Hill Land Co.		Park Hill to Little Rock, Ark.
Southern Associated Bus Lines	Columbia, S. C.	Columbia & Sumter, S. C.
J. H. Spitzmueller	McClure, Pa.	McClure to Burham, Pa.
Matt Koppes	Colesburg, Iowa	Dubuque to Colesburg, Iowa
J. C. Mathias		Keosauqua to Ottumwa, Iowa
Chas. France	Lamoni, Iowa	Lion to Lamoni, Iowa
Mohawk Stage Line	St. Paul, Minn.	St. Paul-Ellsworth, Wis.
Fred W. Hiney	Madison, Wis.	Madison to Lodi, Wis.
Wingra Park Bus Co.	Madison, Wis.	Madison Streets
Tri-State Motor Express Co.	Hamilton, Ill.	Noveto Hamilton, Ill.
George Knighton	Pratt, Kan.	Great Bend to Kiowa, Kan.
Red Line Motor Bus Co.	Collinsville, Ill.	Crystal Lake to Woodstock
Smith Motor Bus Co.		Elgin to Aurora, Ill.
St. Joseph-Archison Short Line	St. Joseph, Mo.	St. Joseph to Bean Lake, Mo.
Bruce Piper		Mexico, Mo., to Columbia
Incorporations		
Company		Address
Blackstone-Kenbridge Bus Line		Kenbridge, Va.
St. Clairsville-Lafferty Bus Co.		St. Clairsville, Ohio
Lynchburg Rapid Transit Corp.		Lynchburg, Va.
Blackstone-Kenbridge Bus Line Inc.		Kenbridge, Va.
Capitol Motor Bus Trans. Co.		Springfield, Ill.
Finot Bus Lines		St. Louis, Mo.
Royal Green Coach Co.		Hamilton, Ohio
Galbraud Bus Corp.		Paterson, N. J.
Ninth & State Belt Line		Camden, N. J.
Piolo Trans. Co.		Paterson, N. J.
Walters Transit Co.		241 East Main St., Decatur, Ill.
Three Star Motor Bus Line		Chicago Heights, Ill.
Nokomis-Motor Bus Line		Nokomis, Ill.
Peoples Motor Bus Co.		Jefferson City, Mo.
Southern Association Bus Line		Columbia, S. C.



## Financial Section

### \$1,141,059 Profit for Fifth Avenue Buses

Statement of Company Holding Stock  
of Operator of New York Line Shows  
Satisfactory Results

THE consolidated income account of the New York Transportation Company, New York, for the year ended Dec. 31, 1922, shows a net profit of \$1,141,059, equivalent to \$1.56 1/2 a share on the voting trust certificates of the Fifth Avenue Bus Securities Company. Substantially the only asset of the latter is 141,194 shares of the stock of the Transportation Company taken into its

#### CONSOLIDATED INCOME ACCOUNT OF NEW YORK TRANSPORTATION COMPANY AND SUBSIDIARY COMPANIES

YEAR ENDED DEC. 31, 1922

Gross earnings:	
Operation of stage lines	\$5,536,175
Private hire	11,797
Advertising	103,901
Miscellaneous	49,582
	\$5,701,455
Operating expenses:	
Maintenance of plant and equipment	\$1,116,564
Traffic and transportation expenses	2,517,718
General expenses	466,895
	4,101,087
Operating revenue	\$1,600,368
Operating ratio, 71.93%	
Add:	
Interest received on investments	\$123,117
Other interest and discount	26,303
Profit on sale of investments	8,798
Rents received	6,893
Damage to vehicles recovered	410
	165,521
	\$1,765,889
Deduct:	
Taxes—City, State and Federal	556,036
Income from operations	\$1,209,793
Deduct:	
Loss on equipment and material sold and scrapped	18,800
Net charges applicable to prior years	49,934
	68,734
Net profit for period	\$1,141,059
Surplus at beginning	2,362,600
	\$3,503,719
Deduct—Dividends	170,000
Surplus, December 31, 1922, per balance sheet	\$3,033,719

books at the average price prevailing at the time of its acquisition, the no par value shares issued against such acquisition being set up as a liability of the same amount. The financial condition of the securities company, therefore, is accurately reflected by that of the Transportation Company.

The Fifth Avenue Bus Securities Corporation was organized on Nov. 14, 1922, as a part of the consummation of

the Interborough Rapid Transit-Manhattan Elevated plan of readjustment, primarily as a means for distributing to Interborough Metropolitan 4 1/2 per cent bondholders their beneficial interest in the 103,574 shares of stock of New York Transportation Company formerly held by the Interborough Consolidated Corporation. These shares were acquired on Dec. 14, 1922, and against them the Securities Corporation issued 321,200 shares of its own common stock without par value to Grayson, M. P. Murphy, Charles H. Sabin and Frederick Strauss, as voting trustees under a voting trust agreement dated Dec. 20, 1922, being at the rate of 3 10/16 shares of voting trust certificates for each share of transportation company stock held. Since that date more than 8,000 additional shares of Transportation Company stock have been acquired, in exchange for which shares of voting trust certificates have been issued at the above-mentioned rate, and such exchanges will for the present continue to be made on the same basis.

Dividends are at present being paid on the Transportation Company stock at the rate of \$2 per share per annum, or the equivalent of approximately 6 1/2 cents per share per annum on the stock of the Securities Corporation. Since the organization of the Securities Corporation there have been two quarterly dividends of 50 cents a share each on the Transportation Company stock against which the Securities Corporation has declared two quarterly dividends of 16 cents per share payable, respectively, Feb. 15 and May 15, 1923.

### Motor Transit Company Net Income Incorrectly Reported

Through an error in transcription, the record of the Motor Transit Company as filed with the California Railroad Commission was not given completely in BUS TRANSPORTATION for June, page 308; the star and also the double stars indicating that express, freight and mail are carried were omitted. F. D. Howell calls attention to this omission and points out that gross revenue, including all non-operating revenue, should be reported as \$1,645,259, and that the \$176,591 shown as net revenue was without deduction of non-operating expense. Taking only transportation revenue and expenses and leaving out the body-shop and other outside non-operating revenue, the net result for the year's operation is a deficit of \$8,231.

### Business Men May Buy Bus Line

Business men of Cumberland, Md., headed by T. B. Finan and D. Lindsey Sloan, are considering the purchase of the bus line owned and operated by E. V. Hull, Hagerstown. The Hull line is among the most extensive bus lines in the state.

Mr. Finan and Mr. Sloan called on the Public Service Commission in Balti-

more to ask for a franchise for a continuation of the company's operation. They were informed that the commission had no objection to the acquisition. Mr. Hull wanted to sell the line, and it would be expected that the company would be a good customer of the line.

It is understood that the company will pay \$110,000 for the line, and that the property will be sold to the company to give effect to the plan.

### Ohio Commission Issues Figures on Transportation by Buses

The large amount of data regarding transportation by buses in Ohio, collected and compiled by the Ohio State Public Utilities Commission.

The figures embody the report from the bus companies for the year 1922. They show that at the beginning of 1923 264 motor bus companies were operating 545 buses in Ohio. During the year the operators engaged in this work carried 11,751,795 passengers at an average of 4,110,133 a month. The gross receipts for 1922 totaled \$2,277,152. Service by bus is given between cities rather than in them.

For purposes of comparison it might be observed that the sixty-seven interurban railways in Ohio carried 215,497,586 passengers in 1922 and had a gross passenger revenue of \$21,013,705.

For the first six months of 1921 175 companies operated 341 buses and carried 2,626,017 passengers with a gross income of \$461,169. This was the first time these companies were required to make any report to the state commission.

In 1922 no fewer than 167 new bus companies were formed. Of the 264 companies operating in 1922, fifty-five had been in business since 1921 and thirty-seven since 1915, while one dates its origin back to 1911.

The largest number of buses operated by any single concern in 1922 in Ohio was fifteen. The Cleveland-Akron Bus Company, operating between Cleveland and Akron, reported gross receipts of \$166,083 in 1922. It carried 209,584 passengers in that year between Cleveland and Akron. It is the largest single carrier of its kind in the State.

The Public Utilities Commission has reports indicating that there are now 120 bus companies operating in the State. The movement to start new lines has been greatly stimulated, however, by the new motor vehicle law, with the result that the number of new projects is increased very rapidly. The new law provides that bus lines in operation before the new state law becomes effective shall not be required to have a certificate of public convenience and necessity, which new companies must obtain from the State Public Utilities Commission. The law goes into effect July 27.

Included in the list of bus companies recently created are a number affiliated with automobile manufacturers and companies.

# Bus Regulation

## California Taxes Bus

Receipts Tax of 4 per Cent and Gasoline Levy Among Measures Passed Recently

THREE bills passed by the California Legislature are of importance to the industry. They are the Duval bill, the Breed gas bill, and the Breed motor vehicle bill. Of these, the first puts a license tax of 4 per cent of the gross receipts on the motor carriers; the second puts a 2 cents per gallon gasoline tax, effective on Sept. 30, 1923; and the third prescribes limiting weight, speeds, etc., of motor carriers, affecting chiefly those in freight and other heavy duty classification.

Senate bill No. 743, a Breed bill, which becomes effective on Jan. 1, 1924, substitutes for the present horsepower tax on motor vehicles a flat registration fee of \$3 for all vehicles except those operated by public service corporations, the federal government and officers of foreign governments, exempt under the State Constitution. The following taxes are assessed against motor carriers:

Trucks not equipped with pneumatic tires:	
Under 3,000 lb. unladen (net).....	\$10
Between 3,000 and 6,000 lb. unladen...	20
Between 6,000 and 10,000 lb. unladen...	30
Over 10,000 lb. unladen.....	40

Commercial vehicles equipped with pneumatic tires, one-half of the above fee, under the same weight schedule. This weight tax averages \$15 a car on the motor stages in operation in California. Fees are doubled if not paid when due.

The tax of 2 cents a gallon on gasoline, effective Sept. 30, 1923, will be paid by the distributors. Exported fuel for consumption outside of the state and fuel "used within the state for purposes other than to propel vehicles upon the highways are exempted." A special exemption is also given to fuel used in rural free mail delivery.

The tax of 4 per cent upon the motor carriers' gross receipts provides for a deduction of "the amount of any country or municipal license and any city and county taxes paid on property actually used and necessary in operation." Any operator who earns 15 per cent of his gross receipts from the mail, parcel post or other transactions with the Federal Government will be exempted from the provisions of the law. As was shown by the vote, the motor carriers did not object to the passage of either of the so-called Breed bills. The association felt that these taxes were both necessary and equitable, and that it was only fair and just they should pay.

The motor carriers felt that their present taxes and licenses, plus the gasoline and weight taxes, and the \$3

registration fee were all that they should be called on to pay. The Legislature thought differently, however, and the Duval bill, in its present form, was the result of that thought. It started as the Arbuckle bill, taxing the motor carriers 7 per cent of their gross receipts, plus any and all taxes and licenses that the motor carriers pay, and wound up as the Duval bill, taxing them 4 per cent of their gross receipts, less certain taxes and licenses that they pay. In one case the levy would have totaled 8.27 per cent of gross receipts, and in the other, 3.17 per cent of gross receipts.

Another provision of the Duval bill requires that motor carriers pay for and carry duplicate licenses which they must obtain from the Board of Equalization. This bill also requires them

to pay the so-called licenses four times a year.

In case of dispute as to the licenses charge, the state can sue and recover the "amount of the costs," and presumably the interest, although interest is not stated. In case the license holder requests payment in writing, he can only bring suit in Sacramento County, and in case he obtains a judgment, "such judgment" is then only a "basis for an appropriation by the Legislature to reimburse"—"in the amount of such judgment, without interest or costs."

William H. Marsh, chief of the division of motor vehicles, estimated that the probable revenue from the Breed and Duval bills would be \$16,000,000 for the year 1923-24; the estimated yield for 1924-25 is \$18,000,000.

## Competition Not Sanctioned

Illinois Supreme Court Upholds Judgment Against Bus Line—Rules in Effect that Competition Will Not Be Tolerated Except in Extreme Cases and Clearly Defines Its Attitude

THE Supreme Court of Illinois on June 24 affirmed a judgment recently handed down by the Superior Court of Cook County wherein it reversed the order and decision of the Commerce Commission relative to the operation of a bus line in competition with an electric railway.

The opinion of the court was delivered by Chief Justice Farmer. It is regarded as bringing to light phases of public utility operation and ownership relative to service and rates of fare which may serve as a precedent in future controversies of the kind.

The bus company had secured a certificate of necessity and convenience from the Illinois Commerce Commission, and after complying with the rules and regulations of the commission it started to operate buses along a route which in many places parallels the existing railway.

Notwithstanding the opposition of the railway when the bus line first sought an operating permit, the Illinois Commerce Commission decided to issue a certificate of necessity and convenience to the bus company, but this order was reversed by the Superior Court of Cook County. The bus company then appealed the decision to the Supreme Court of Illinois.

In a few words, the ruling of the high court of the state is interpreted to mean that a bus company will not be granted the right to operate through a territory served by an electric railway unless the public as a whole as distinguished from any number of individuals is inconvenienced by such an operation.

The decision of the Supreme Court follows in full:

The West Suburban Transportation Company applied to the Illinois Commerce Commission for a certificate of convenience and necessity and authority to operate motor vehicles for the transportation of passengers and property in towns west of Chicago, called in this record the West Towns. The routes over which authority

was sought to operate motor buses are described as follows:

Route 1. Beginning at Forty-eighth Avenue and Twenty-second Street, west on Twenty-second Street to Oak Park Avenue, south on Oak Park Avenue to Ogden Avenue, thence west on Ogden Avenue to Hinsdale by way of Berwyn, Riverside, Lyons, Brookfield, Congress Park, LaGrange, LaGrange Park, Western Springs and Fullersburg.

Route 2. Beginning at Twenty-second Street and Forty-eighth Avenue, south to Ogden Avenue, west on Ogden Avenue to Hinsdale by way of Clyde, Berwyn, Riverside, Lyons, Brookfield, Congress Park, LaGrange, LaGrange Park, Western Springs and Fullersburg.

The Chicago & West Towns Railway has for several years operated a street railway through most of the same towns and resisted the application of the bus company for a certificate of convenience and necessity and authority to operate bus lines in the same territory. Applicant, the bus company, proposed to operate five motor vehicles on a fixed schedule at a definite rate of fare and receive and discharge passengers at any and all points along the route.

The railway objected that the bus lines duplicate its transportation system, and, in part, parallel its street railways on the same streets and would create competition between the two companies, using different means of conveyance. After a hearing the Commerce Commission on April 19, 1922, entered an order that the operation of the bus lines over the routes described was a convenience to the public and a necessary transportation facility, and the commission ordered that upon the bus company complying with certain conditions for the protection of the public a certificate of convenience and necessity issue.

The railway appealed from that order to the Superior Court of Cook County, where, after a hearing, the order and decision of the Commerce Commission were reversed and set aside. From the judgment of the superior court the bus company has prosecuted this appeal to this court.

On June 21, 1922, the Commerce Commission made an order that appellant had complied with the conditions of the order of April 19, 1922, and granted the bus company a certificate of convenience and necessity and authority to operate its motor vehicles on the routes mentioned. No appeal was prosecuted from the order of June 21, and appellant contends the Superior Court should have affirmed the order of April 19 or dismissed the appeal. This contention is based on the last clause of section 68 of the Public Utilities act, which provides that where no appeal is taken from the decision of the commission, the parties affected by the order and decision "shall be deemed to have waived the right to have the merits of said controversy reviewed by a court."

The order of April 19 was entered after a hearing on the merits of appellant's petition for a certificate of convenience and



necessity. The order of the commission was that the operation of the bus lines by appellant was a convenience to the public and a necessary transportation facility. The conditions imposed were that appellant file a copy of its certificate of incorporation, copy of chauffeurs' license, indemnity bonds and consents of villages, and the order further reads:

"It is further ordered that unless the findings and order herein are strictly adhered to and fully complied with within twenty days from the date hereof the applicant shall discontinue operation."

It seems clear the order and decision authorized the operation by appellant of motor vehicles, subject to discontinuance at the expiration of twenty days if the conditions named had not then been complied with. It was a decision on the merits of appellant's petition, and nothing further was left to be done except filing the proof by appellant that it had complied with the conditions. We are of opinion that the superior court did not err in not dismissing the appeal.

Appellee has for many years maintained and operated through the West Towns west of Forty-eighth Avenue, lines of railway for the transportation of passengers. The Western Electric plant is situated on Forty-eighth Avenue and extends south from Twenty-second Street. It employs approximately 25,000 persons. The bus lines terminate at the Western Electric plant on the east. One of appellee's railway lines runs from that plant west on Twenty-second Street to Harlem Avenue, thence south to Twenty-sixth Street, west and south through the north edge of Riverside and Brookfield, south through LaGrange Park, and terminates at Stone Avenue station, in LaGrange. The proof showed it carries on this line as many as 3,600 passengers in one day and furnishes service approximately every twenty minutes. Another of appellee's lines runs from the Western Electric plant west on Twenty-fifth and Twenty-sixth Streets to Ridgeland Avenue, in Berwyn, thence south and west to the line between Berwyn and Riverside (which is Harlem Avenue), thence south on Harlem Avenue to Ogden Avenue, and southwest along Ogden Avenue into Lyons, where the line terminates.

The proof shows that it carries as high as 6,200 passengers a day on this line, with a schedule of a car from five to fifteen minutes. Appellee also operates a north and south line in Cicero, extending from Twenty-second Street south to Thirty-sixth Street, which is more than a mile south of Ogden Avenue, over which the bus lines operate. Appellee also operates a line north on Forty-eighth Avenue from Twenty-fifth Street. With the exception of Western Springs, Hinsdale and Fullersburg both transportation lines operate through the same towns and are at no point more than a mile apart, but through approximately nine-tenths of the territory served by both transportation companies they are much nearer, and both lines are in the same street from Forty-eighth Avenue to Oak Park Avenue, a distance of about 3 miles.

If the transportation facilities furnished by appellee are so inadequate as to subject the public inconvenience and the operation of appellant's bus lines would eliminate that inconvenience the order of the commission was authorized. It is not the policy of the public utilities act to promote competition between common carriers as a means of providing service to the public. The policy established by that act is that through regulation of an established carrier occupying a given field and protecting it from competition it may be able to serve the public more efficiently and at a more reasonable rate than would be the case if other competing lines were authorized to serve the public in the same territory.

Methods for the transportation of persons are established and operated by private capital as an investment, but as they are public utilities the State has the right to regulate them and their charges, so long as such regulation is reasonable. The policy of the public utilities act is that existing utilities shall receive a fair measure of protection against ruinous competition. Rates of fare charged for service are subject to regulation by the Commerce Commission within reasonable limits, but the commission has no power to make a rule or order regulating a utility which would amount to a confiscation of its property or require operation under conditions which would not provide a reasonable return upon the investment.

Where one company can serve the public conveniently and efficiently it has been found from experience that to authorize a competing company to serve the same territory ultimately results in requiring the public to pay more for transportation, in order that both companies may receive a

fair return on the money invested and the cost of operation.

The Chicago, Burlington & Quincy railroad runs southwest from the Western Electric plant through Cicero, Berwyn, Riverdale, Brookfield, LaGrange, Western Springs, and Hinsdale, and performs a large part in the transportation of the public in these towns. It has fifteen stations between the Western Electric plant and Harold, a distance of about 8 miles and runs from morning to thirty-four trains each way daily.

It does not appear that the public has ever made an complaint that the transportation service in the town mentioned was inadequate or insufficient, and no proof was introduced on the hearing to that effect except the testimony of appellant's officer and then to the effect that not more than one or two perfectly small portions of the population of the West Towns would be more conveniently served by the operation of the bus lines.

The Commerce Commission has no authority to order that the public be served in a safe, comfortable and lawful, and the question whether they are or not is subject to review on appeal. (Public Utilities Commission vs. Toledo, St. Louis & Western Railroad, 267 Ill. 93, Chicago Bus Company vs. Chicago Stage Company, 287 Ill. 329.) To authorize the Commerce Commission to grant appellant a certificate of convenience and necessity and authority to operate its lines to serve the same public already served by an existing utility, it was required that it be shown the existing utility was not rendering adequate and convenient service and that the operation of the bus lines would eliminate such inadequacy and inconvenience. In determining that question the primary consideration is the convenience and necessity of the public. (Public Utilities Commission vs. Cleveland, Cincinnati, Chicago & St. Louis Railway, 288 Ill. 502.)

Whether the public convenience and necessity require the establishment of a new transportation facility is not determined by the number of individuals who may ask for it. The public must be concerned as distinguished from any number of individuals. (Public Utilities Commission vs. Toledo, St. Louis & Western Railroad, 266 Ill. 522.) Some individuals, perhaps a considerable number, would be inconvenienced by the operation of the bus lines, but it is clear from the record that to the great body of the public it would be neither a convenience nor necessity. It was not within the authority of the commission to authorize the operation of the bus lines for the convenience of a small part of the public already served by other utilities at no very great inconvenience.

The order appealed from stated the bus company proposes to operate its transportation facilities at a lower rate of fare than the public is now paying, and in appellant's brief it says the fare charged is 5 cents, but the order does not fix the rate of fare to be charged. Assuming appellant is limited to a 5-cent fare and appellee is charging a larger rate, that was not, of itself, sufficient to authorize the order of the commission. The commission had authority to regulate the rate charged by the appellee, and if its fares were excessive to reduce them.

Fares are not the only thing to be considered in a case of this kind. The public is interested and vitally concerned in adequate transportation facilities at reasonable rates and the State is interested in assisting to get them, but the State cannot, as we have said, require a carrier to furnish service at a rate which will not pay a fair return on the investment and cost of operation. We are not advised that any complaint had ever been made to the commission that appellee is charging excessive rates, and so far as this case is concerned we will assume it is not doing so. The effect of authorizing the operation of the bus lines at a lower fare to serve the same territory would be to decrease appellee's revenues, and if the rate it is now charging is a reasonable one, to require it to operate at a loss or increase its rate. This would be against the public interest, because appellant's lines cannot accommodate more than a comparatively small portion of the public.

The Superior Court found and adjudged that the order of the commission was against the manifest weight of the evidence heard, that the operation of the bus lines is not a convenience to the public and a necessary transportation facility, that the present transportation facilities are not inadequate and do not subject the public to inconveniences which will be eliminated by authorizing the operation of the bus lines, and that the order and decision of the commission are unreasonable. We are of opinion the decision of the Superior Court was right, and its judgment is affirmed.

The briefs in this case do not reach the court for a rehearing. It is, however, not allowed it was argued to the United States Supreme Court on the ground of confiscation.

## New York Mutual Insurance Provisions Summarized

Under Chapter 821 of the Laws of 1923 of New York the mutual insurance company method of doing business is being followed in the following way:

Five hundred persons, each owning at least five hundred dollars in property, may become members of a mutual corporation and apply for and agree to take such insurance thereon, the annual premium cost of which shall not exceed \$750,000, 50 per cent of which shall be paid into the corporation. In lieu thereof the corporation must have a cash fund of at least \$500,000 available for the payment of losses.

The second proposition is that two persons owning at least 600 dollars in property must agree to become members of such corporation and apply for and agree to take such insurance thereon, the annual premium cost of which shall be not less than \$200,000, 50 per cent of which must be paid into the corporation. In lieu thereof the company must have a fund of \$50,000 available for the payment of losses.

Compliance with these provisions entitles the mutual corporation to insure under either plan of organization against accident, burglary and theft and property damage (except fire).

The superintendent of insurance will exercise supervision over the amount of reserve to be maintained, as well as over rates, and it is provided that at all times the full minimum amount of insurance required to organize must be maintained in force.

## Home Rule on Buses Retained in Wisconsin

The Wisconsin Assembly has killed bill No. 506-A, which, if enacted, would have given electric railways the exclusive right to operate buses, vesting with the State Rail Commission the authority to determine the condition under which the buses would be operated over streets of any city, town or village.

Under the bill the right of the city of Milwaukee to obtain for the Common Council the power to regulate motor buses would have been lost, and no company other than the local railway could have operated motor buses unless it obtained a certificate from the Wisconsin Railroad Commission.

The opinion of those who voted against the measure was that cities should have the right to impose terms and conditions upon bus companies as a condition for using the city streets. As they interpreted the bill the Milwaukee Electric Railway & Light Company, if the measure had become a law, would have had the exclusive right to operate buses in Milwaukee and the surrounding territory.

# Personal Notes

## America's First Bus Driver

Edward Wotton, Who Recently Joined the Forces of the Chicago Motor Coach Company, Ran First Fifth Avenue Bus

**T**HE first bus driver in America. This is the distinctive title that must be given to Edward Wotton, former superintendent of equipment of the Fifth Avenue Coach Company and now with the Chicago Motor Coach Company. In 1906 Mr. Wotton drove the first bus regularly carrying passengers on Fifth Avenue, New York.

Mr. Wotton was born about forty



Edward Wotton

years ago in Gloucestershire, England. When only nine years old he plowed, fed the horses, milked cows and busied himself at other chores on a farm in his home town. Here for four years he served in the steam haulage end of the business. At sixteen he was driving steam rollers and traction engines. All this is not such a far cry from bus driving, for Mr. Wotton in these years was gaining a wide knowledge of motor vehicles.

At the age of twenty he joined the firm of Brazill, Holbrow & Straker, Bristol, England, manufacturers of steam lorries. Here he served as demonstrator for a period of three years. It was this firm that began the construction of the first gasoline buses to be made in England. Mr. Wotton's job was to demonstrate the merits of these buses to probable purchasers. The model chassis chosen for the first gasoline bus was imported from Germany and its style was not unlike the German model of today.

After a period of experimentation the English company achieved what seemed to be a satisfactory gasoline bus, but

all the time it was in a serious competition with the De Dion-Bouton and Daimler makes.

In 1906 Mr. Wotton decided that the U. S. A. was the place for him. After being here a few months he secured a position with the Fifth Avenue Coach Company, which at that time had just ordered one De Dion bus from London. This bus was ordered for trial. Its operation under Mr. Wotton's driving and the direction of others learning the art was so satisfactory that the directors placed an order for fourteen more buses of the same type. At that time about fifty horse-drawn buses were being operated by the company and the lone motor bus was a source of considerable interest to the public, slow at first to grasp the joys of riding on the bus.

### FIRST RUN 10 MILES

Mr. Wotton's run with the motor bus was from Ninetieth Street to Washington Square and return, a distance of more than 10 miles through the heart of the city, and he tells of frequently making this entire trip without a traffic block. He also tells of driving on several occasions during the first winter and gathering in as few as two fares a day. This, of course, takes into account the fact that the bus fare was 10 cents while the horse-drawn buses charged only 5 cents.

In June of the following year, 1907, fourteen De Dion buses arrived from abroad and were put into active service with splendid results. Six of these buses, knocked down, arrived at Philadelphia and were assembled there under Mr. Wotton's direction. The bodies for these chassis were then attached and the buses were driven to New York, with officials of the company at the wheel. Mr. Wotton drove one of these buses.

In the year's interval during which Mr. Wotton operated the lone bus he spent time in training the drivers of the horse-drawn buses to become bus drivers and ten men were at once ready, upon the arrival of the De Dion fleet, to take the wheel and operate the buses successfully. It is a striking fact that these buses were not taken out of service until September, 1916, a fitting commentary upon the care which they received from the company's mechanical department.

In 1907 Mr. Wotton was made foreman of the mechanical department, and after five years in this capacity he was made general mechanical foreman and in 1918 superintendent of equipment. In 1910 Mr. Wotton had been made general foreman of the cab business of the company, and in the following year he

and Richard W. Meade, then president of the company, were together in England and France for an examination of motor buses and motor cabs. He became superintendent of equipment of the Fifth Avenue Company some time later and retained this post until March 1, this year, when he resigned to join the organization of the Chicago Motor Bus Coach Company as superintendent of equipment.

## Mr. Cameron, Business Manager

David Cameron has been appointed business manager of BUS TRANSPORTATION and *Electric Railway Journal*, effective July 1. He succeeds L. W. Seeligsberg, who has resigned to engage in advertising work for himself. Having served in the field as a salesman on both papers for a number of years Mr. Cameron comes to the main office to take charge with a background of selling experience and a knowledge of conditions confronting the manufacturers serving both the motor bus and railway



David Cameron

fields, which are believed to fit him eminently for his new position.

Mr. Cameron has been continuously with the McGraw-Hill Company and its predecessor the McGraw Publishing Company since his graduation from college in 1914. He started in as make-up man on *Electric Railway Journal*. After about a year he was transferred to the subscription department, where he served as assistant manager, working on all the McGraw publications. Then for about six months he did some special work for Mr. McGraw, which was terminated when he entered the air service as a second lieutenant and pilot, serving in France for eight months.

When he received his discharge he came back with the company and was the Chicago district advertising manager of *Electric Railway Journal*. Later, with the establishment of BUS TRANSPORTATION, he became the Cleveland district advertising manager for both BUS TRANSPORTATION and *Electric Railway Journal*.

Mr. Cameron was born at Houtzdale, Pa., Feb. 26, 1893. His early education

was in the Wellsboro, Pa., High School, and he received his college training at Cornell University, University of Michigan and Dickinson College, Carlisle, Pa. He received his A. B. degree from Dickinson, where he was also elected to the honorary society Phi Beta Kappa.

### London Underground Officials Visit United States

J. C. Mitchell, secretary and treasurer of the London Underground System; A. Rozier, superintendent of rolling stock of the London General Omnibus Company; E. Boys, secretary of the London Suburban Traction Company, and Ivor Fraser, publicity manager of the London Underground System, have returned to England after a short visit to the United States.

They studied railway problems and transportation by bus, and started on May 9 on a tour of cities in the East and the Middle West which included in the order named Albany, Montreal, Toronto, Buffalo, Cleveland, Detroit, Chicago, St. Louis, Cincinnati, Pittsburgh, Washington, Baltimore and Philadelphia.

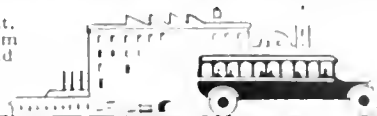
It is under Mr. Fraser's direction that the excellent work in bettering public relations in London has been done for the so-called Underground group. This work, it will be recalled, has included the advertising of the lines, one of the most important features of which has been the use of posters reproduced from time to time in these pages.

In speaking of bus operation in London Mr. Fraser said that the remarkable fact was that there seemed to be no limit to the bus patronage. No sooner were additional buses installed than their capacity was almost immediately exceeded. He said there appeared to be no saturation point in sight. Mr. Fraser spent a good deal of time studying bus operation on Fifth Avenue. A point that struck him quite forcibly as being in contrast with London was the lack of any paid advertising on the outside of the New York buses. This is, of course, a distinction that naturally would strike home quickly to a man whose main work is in the fields of publicity and advertising.

William D. Reese, for the past four years research engineer of the Fifth Avenue Coach Company, New York, has resigned that position to join the Yellow Sleeve Valve Engine Works organization at Moline, Ill. In his new position Mr. Reese will aid George A. Green, formerly vice-president and general manager of the Fifth Avenue Company, now with the Chicago Motor Coach and allied companies in a similar capacity. Before coming to the Fifth Avenue Company, Mr. Reese was with the Locomobile Company, Bridgeport, Conn., and later with a company engaged in the manufacture of tanks for the British government, where he first came into contact with Mr. Green.

# Business Information

What is being bought and built. Latest news from the factories and the field.



Market quotations affecting the bus industry. Price changes in important raw materials.

## Tire Prices Reduced

Firestone Announcement Followed by Miller, Goodrich, United States Rubber, Goodyear, Kelly Springfield and Hood.

WITH American automobiles utilizing more than half of the world's output of rubber the announcement of recent price reductions by Firestone and other large tire manufacturing companies is a matter of no little importance.

The price cuts range from 7 to 15 per cent on different makes and types of tires so that it is safe to say that, whether or not announcements of reductions in price have been made public by particular manufacturers, tires can be purchased at figures that average 10 per cent lower than similar prices a month ago.

H. S. Firestone has been very aggressive in fighting British rubber interests who have been striving, according to general opinion, to control the market prices on crude rubber. Mr. Firestone has also advocated the development of rubber growing in the Philippine Islands under the American flag so that users of tires in the United States would not be dependent upon the British controlled market to furnish the crude rubber supply.

The lower cost of crude rubber and further economies in manufacturing have enabled manufacturers to cut prices, according to Mr. Firestone. Crude rubber is now around 28 cents a pound, while immediately following the announcement of the restrictive legislation last October the price of plantation

rubber advanced from 14 to 15 cents a pound.

The increase last fall, Mr. Firestone said, is not attributed to the workings of the natural economic law of supply and demand but to speculation and speculation in the market where a shortage was anticipated. The rubber growers, who had also created confidence of the administration of the legislation through the British Colonial Office, became alarmed at the growing public sentiment aroused by activities of American users and the result was that much more rubber was forthcoming from the British restricted possession than the most optimistic estimate predicted at the time of the enactment of the legislation. Mr. Firestone recently said:

"The British rubber growers responsible for the legislation either cannot or do not wish to control the situation and enforce the law to the letter, because from information I have gathered I believe they now fear the results of strict enforcement, as it would cause a shortage of rubber and naturally strengthen those of us who are opposing the law. The restriction act provides that only 60 per cent of normal (1920) production shall be exported, but as a matter of fact close to 100 per cent is coming from the restricted area."

## Legislative Action to Bring About Production of Better Trucks

W. L. Day, president and general manager of the General Motors Truck Company, Pontiac, Mich., believes the people will see vastly different types of trucks and passenger vehicles than those now in use.

"Many legislatures are discussing laws to govern trucks," Mr. Day says. "Some of these laws embody gasoline taxes, others weight taxes and others just plain, ordinary bills which seek to curb the motor truck's growth."

"Contrary to general belief, the truck manufacturer welcomes fair laws. They will have effect in two ways. First, they will increase the state revenues, which in turn will increase the good roads, while the roads will make the sale of motor trucks much easier."

"Secondly, they will stimulate engineers to reduce the weight of trucks and to so construct the motors that they will give greater mileage than they do now. This means better transportation at less cost, and this, in turn, means more sales for the truck manufacturer."

"It is a fact that the sales of motor trucks will increase in exact proportion to the economy with which they can be operated, for the average business man

## Gasoline Prices—June 25, 1923

City	Cents Tank Wagon	Per Gal. Service Station
Albany, N. Y.	21 5	23 5
Atlanta, Ga.	21	23
Boston, Mass.	20 5	23
Chicago, Ill.	20	22
Cincinnati, O.	21	23
Detroit, Mich.	21 4	23 4
Fort Worth, Tex.	18	21
Indianapolis, Ind.	19 8	23 8
Jacksonville, Fla.	19	21
Kansas City, Mo.	19 5	22 5
Louisville, Ky.	22	24
Memphis, Tenn.	19	21
Milwaukee, Wis.	20 6	23 6
Mobile, Ala.	21	22
Newark, N. J.	23	25
New Haven, Conn.	22	24
New Orleans, La.	16 5	18 5
New York, N. Y.	21 5	23 5
Oklahoma City, Okla.	18	19
Omaha, Neb.	20 5	22 5
Philadelphia, Pa.	21	24
Pittsburgh, Pa.	21	24
Richmond, Va.	22	24
St. Louis, Mo.	19 2	21 5
St. Paul, Minn.	20 7	22 7
Salt Lake City, Utah.	24	26
San Francisco, Calif.	16	19
Seattle, Wash.	18	21
Spokane, Wash.	21 5	24 5
Washington, D. C.	24	26

will buy only when it can be shown that the truck can save him money over the older methods of transportation."

### Change to Oversize Tires Found Economical

Stages of the Valley Transit Company, running out of Fresno, Calif., which have heretofore been equipped with 36-in. x 6-in. tires, are being equipped on rear wheels with tires of 38-in. x 7-in. sizes.

The latter size has now been made standard for eighteen-passenger stages, and based on tests thus far made are expected to show considerable economies over the smaller size.

The territory served by this company is practically all on level roads. Fairly high speed is maintained, and particularly on pavement with black tops high road temperatures are reached. Under these conditions with the larger size tires less overheating and fewer blow-outs are expected.

### Rolling Stock

**Kingston (N. Y.) Beauville Line** has installed a Reo sixteen-passenger bus with Paterson body.

**Camus Stage Company**, operating out of Portland, Ore., has put a new Fageol safety coach in service.

**Enomelaw Transportation Company**, Seattle, Wash., has placed a Fageol safety coach in service.

**Canton-Akron Trackless Coach Company**, Canton, Ohio, has ordered three new White buses for its line.

**Thomas C. Pitney**, Milford, Pa., has recently purchased a twenty-five-passenger Ace motor coach.

**Frank H. Kroboth**, Greene, N. Y., has enlarged his operations by the addition of a Fageol safety coach.

**Mr. Jahn** has installed two new Pierce-Arrow chassis, with Paterson bodies, on the Hackensack-Dumont line.

**Motor Coach Company**, Lomita, Cal., has installed the first unit of a fleet of Fageol street car type safety coaches.

**C. I. Ward**, Madison, Wis., has ordered a twenty-passenger Stoughton bus for use between Madison and Kilbourn.

**Peerless Stages**, Oakland to San Jose, Cal., has added another Fageol safety coach to its fleet and has more on order.

**Doertler & Nussbaum**, Appleton, Wis., will operate a fifteen-passenger Reo bus on their line between Appleton and Green Bay.

**Doty & Carlson**, Mountain, Wis., have purchased a sixteen-passenger Reo bus for use between Mountain and Green Bay.

**A. C. Homan Bus Line Company** has added a twenty-five-passenger White car to its bus line between Neenah and Oshkosh.

**Interstate Transportation Company**, Minneapolis, Minn., has received a twenty-two-passenger Fageol intercity model safety coach.

**Valley Transit Company**, Fresno, Calif., now has four Fageol safety coaches in service on the run between Oakland and Los Angeles.

**W. M. Wood**, Camden, N. J., has recently purchased four thirty-passenger Ace motor coaches for sightseeing purposes at Atlantic City, N. J.

**Nick Backhaus**, Manitowish, Wis., plans to purchase a fifteen-passenger bus for use in service between Fond du Lac and Manitowish.

**Lewis H. Blair**, Clear Spring, Md., has installed a Fageol intercity model safety coach for service between Clear Spring and Hagerstown.

**Greenwald & Lehr**, Mount Horeb, Wis., have purchased a fourteen-passenger Stoughton bus for use on their line between Madison and Kilbourn.

**Badger Auto Service Company**, Milwaukee, has added two more Hudson seven-passenger cars to its line between Milwaukee and Waukesha.

**Nokoma Bus Line**, Madison, Wis., which operates a bus line from Nokoma to Madison, has recently purchased a new sixteen-passenger White bus.

**West End Transportation Company**, Mount Horeb, Wis., has purchased a twenty-passenger Stoughton bus for use between Dodgeville and Dubuque.

**Motor Bus Company**, Chippewa Falls, Wis., has purchased an eighteen-passenger White bus for use on its line between Chippewa Falls and Eau Claire.

**Frank Livenstein** is putting a Mack chassis, with twenty-nine-passenger Paterson body, into service on the Governor Street line, Paterson, N. J.

**Franklin G. Greenfield**, Williamstown, N. J., has purchased four new thirty-passenger Ace motor coaches for use between Ocean City and Atlantic City, N. J.

**David Goldberg**, operating between Yonkers and Rye Beach, N. Y., has purchased a Model 50 White bus chassis with twenty-nine-passenger Paterson body.

**William Fortune**, Bloomingdale, N. Y., owner and operator of the Paul Smiths-Saranac Lake Bus Line, has recently purchased a twenty-passenger G. M. C. bus.

**Frank C. Perkins**, Commissioner of Public Affairs of Buffalo, N. Y., has asked the City Council to advertise for bids for 100 single and double-deck buses for the operation of a municipal bus route.

**Eagle Bus Line**, of which Mr. Van Kleek is owner, has installed a White Model 50 bus chassis with twenty-nine-passenger Paterson body on the line between Kingston and Ellenville, N. Y.

**Bay Cities Transit Company**, Santa Monica, Calif., has been authorized by the State Railroad Commission to issue not more than \$25,000 of 7 per cent promissory notes for financing in part the purchase of fourteen 2-ton G. M. C. trucks.

**Bailey Bus Line**, operating between Watertown, Clayton and Alexandria Bay, N. Y., will soon put in operation a new thirty-passenger Menominee bus of 220-in. wheelbase with special body manufactured by the E. J. Gabourie Company, Sherman Street, Watertown, N. Y.

**Pellett Auto Service**, operating from Wilimantic to Danielson, Conn., and from Danielson to Providence, R. I., has purchased two fifteen-passenger International Harvester buses to supplement the equipment of cross seat school buses used originally on the line.

**Kennedy Heights & Montgomery Bus Company**, which operates between Norwood and Montgomery, Ohio, with three Dietzman buses, will establish a new route between Norwood and Loveland. The company, headed by Henry Staley, Montgomery, has ordered three White buses. The bus company started operations six months ago.

### Business Notes

**H. Waker** has been appointed treasurer of the Robert Bosch Magneto Company, Inc., New York City.

**Remy Electric Company**, Anderson, Ind., announces that R. K. Evans, formerly one of its sales engineers, has been appointed service manager. He succeeds E. E. Eby, resigned.

**American Motor Truck Company**, Newark, Ohio, manufacturer of the Ace Motor Coach, has opened a direct factory branch at Philadelphia, Pa., in charge of V. C. Bailey, 5929 Woodland Avenue, Philadelphia, Pa.

**McKenzie Carring & Body Works**, Wichita, Kan., has recently started to manufacture bus bodies. For a long time the works was engaged in the making of buggies and buggy bodies, but with the advent of the auto as a public carrier it entered the bus business.

**C. S. Thomson**, export manager of the Four Wheel Drive Auto Company, Clintonville, Wis., sailed recently for South America. He expects, before returning, to visit all E. W. D. dealers in South American countries and spend a little time with each in arranging his work for the future. Mr. Thomson expects to be away for about five months.

**Republic Motor Truck Company**, Inc., elected a new board of directors on June 4 as a result of the recent reorganization. M. N. Buckner, chairman of the board of the New York Trust Company, will be chairman of the Republic board. Other new members include J. A. Bowers, Maurice Rothschild, George W. Morgan and O. W. Hays. G. S. Crisp, formerly comptroller, is the new secretary and treasurer. E. E. Sieg is sales manager.

**Guy Wilson**, who with others founded the Traffic Motor Truck Corporation in St. Louis six years ago, has announced the formation of a new truck and motor bus manufacturing company with a capital of \$3,000,000 to be known as the Victor Motors, Inc. Its headquarters and principal factory will be in St. Louis and operations will begin in the near future. The company will specialize in the manufacture of buses, taxicabs, heavy-duty trucks and speed trucks. Arrangements with dealers have already been concluded, it has been announced. Mr. Wilson is president of the company and Sherman H. Dorsey, vice-president.

**Westinghouse Air Brake Company**, Wilmerding, Pa., has appointed Horace S. Clark as Pacific district manager, succeeding C. P. Cass, who has resigned to devote more time to the affairs of the Westinghouse Pacific Coast Brake Company, of which he is president. Mr. Clark, who was assistant manager of the Pacific district before Mr. Cass resigned, will continue his headquarters in San Francisco as heretofore. Both Mr. Clark and Mr. Cass have a wide acquaintance among bus builders and operators, particularly in the West, due to the prominent part they have played in the development of the Westinghouse automotive air brake.

**D. K. Curll**, who has been engaged in special sales work for the International Harvester Company of America at the main Chicago office, has recently been placed in charge of motor truck sales. Mr. Curll entered the service of the Harvester Company twenty years ago. Mr. Curll began in 1903 as salesman at the company's Pittsburgh branch. A year later he was promoted to blockman and in 1909 was advanced to special salesman at the Harrisburg branch. In 1910 he became assistant branch manager at Harrisburg and in 1911 was transferred to Baltimore. He returned in 1915 to Harrisburg, where in 1917 he was promoted to manager. In 1918 he received the call to Chicago.

**Darcoid Company, Inc.**, has been formed to take over the manufacture and distribution of the packings, mechanical rubber goods and miscellaneous asbestos and rubber products of the Dominion Asbestos & Rubber Corporation. The Dominion Asbestos & Rubber Corporation will confine its activities to the manufacture and distribution of Dominion brake lining and the new Dominion shock absorber. William M. Meek, president of the Dominion Asbestos & Rubber Corporation, is president and treasurer of the Darcoid Company. William F. McLean, formerly of the Gutta Percha & Rubber Manufacturing Company, is vice-president, and M. Rueger, formerly of the Dominion Asbestos & Rubber Corporation, is secretary.

**Ross Gear & Tool Company**, Lafayette, Ind., has added E. Gruenewald and F. F. Chandler to its organization in order to take care of large scale production on its new cam and lever steering gear. Mr. Gruenewald becomes factory manager of the Ross plant; he held a similar position for sixteen years with the Root & VanDervoort Engineering Company, Moline, Ill., having full charge of all production of Knight and poppet valve motors. He also had charge of the Root & VanDervoort foundries. Mr. Chandler is very well known in automotive engineering circles, having been connected for many years with the Chandler & Taylor Company, Indianapolis. He has recently been serving as a trustee of Purdue University and chairman of the Indiana Section of the Society of Automotive Engineers. Mr. Chandler will devote his activities to sales promotion on the new cam and lever steering gear.

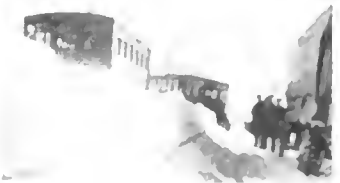
### Advertising Literature

**G. C. Kuhlman Car Company**, Cleveland, Ohio, has published an eight-page pamphlet describing its type C steel-frame bus body. Dimensions are given for the twenty-one, twenty-five and twenty-nine passenger sizes, and particular emphasis paid to the Kuhlman truss type of side construction and the Brill "Renitent" post casing.

**International Motor Company**, New York, N. Y., has issued a forty-eight-page catalog, known as No. 101, descriptive of its Model A B chain-driven motor trucks 1½, 2 and 2½ tons. The catalog is unusually complete with respect to the text and is profusely illustrated. The company explains that it does not make anything but commercial vehicles and never has made anything but such vehicles.



# BUS TRANSPORTATION



New York, August, 1923

## In the Snow Country Bus Lines Keep Their Routes Open in Winter

**T**HE bus lines in northern New York State may have snow to contend with for nearly six months in the year. At times the winters are particularly severe and the snowfall is likely to range from 1 to 7 or 8 ft. With the high winds that prevail the snow is blown into drifts 12 to 15 ft. deep, and often nearly a half mile long, notwithstanding that snow fences are used where experience has shown that such drifts regularly occur.

Bus operation under such climatic conditions is naturally full of difficulties, the more so because neither the state nor any of the towns make any attempt to break open, much less to clear, the highways. The bus owners, therefore, have had to keep the roads open as best they could, if they were to keep running. Much initiative has been exercised and several types of plows have been tried out and then discarded as better ones were developed. Their persistent efforts have been rewarded, for during the last winter, when nearly 90-in. of snow fell during January and February, the bus lines that had modern snowplow equipment were not blocked for any long periods. In fact, Carpenter's Bus Lines out of Watertown held to its schedule except for one three-day period, while Dailey was blocked completely for a little more than a week. Other lines hold similar records of performances.

The bus operators, in Watertown and vicinity, believe it is beneficial to keep their lines open during the winter, because during that time they have the least competition. This naturally means the heaviest traffic, except on the resort lines serving points along the St. Lawrence River, where traffic is heavier in summer.

To date the bus owners report that the cost of keeping the roads open

**O**PERATORS in northern New York have developed efficient snow plows along new lines. Some models have a balanced nose plow hung amidships with broad, substantial wings on the right-hand side which are used in leveling snow. Another type, to combat the drifts prevalent in the open country, puts a plow in front, then a scoop and nose break up the hard snow, and two sets of leveling wings push it to either side. Plow blades are made of boiler plate and angle irons.

is borne almost entirely by themselves. Only in rare instances have the towns appropriated any money to help defray the expenses of the bus men, and then in such small amount as to hardly pay for the fuel burned in any one storm. However, in the smaller towns the merchants have given freely of help, to man the plows and to break open the roads when blocked.

In Watertown the city has a couple of motorized snow plows, one of which is illustrated. These plows operate in conjunction with those of the Watertown Transportation Company, the local bus company, but the city expects the bus company to clear from curb to curb the streets over which it operates. The only exception to this is the Public Square. This the city takes care of itself, cleaning the streets and carting away the snow.

### TYPES OF PLOWS IN USE

The motorized type of plow as developed in northern New York is of unique construction. It appears far superior to any type heretofore developed in that its blades are so lo-

cated amidships that, owing to the weight of the vehicle itself, it is able to push the plow equipment and the ballast effectively to stabilize the unit, thereby increasing its efficiency in deep snows.

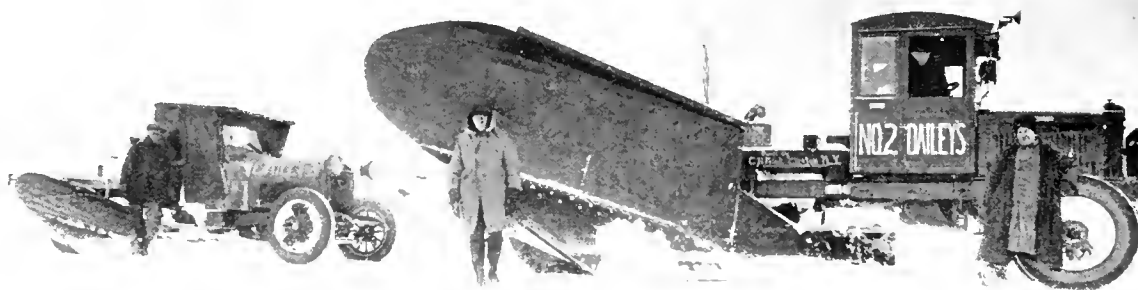
The plows might be said to be a development of the old system of breaking roads with horses and sleds, before the days of the motor-bus. However, for efficient performance as much of the snow as possible must be cleared away during the storm. Most operators put out their plows immediately it begins to snow and keep them out until the snow ceases and wind dies down. The plows can handle the ordinary snowfall without any difficulty; with their high speed and underslung nose, which can be raised and lowered as desired, the snow from the highway can be thrown completely from the roadway. The wind really causes the trouble, packing the snow into drifts so hard that at times the side wings cannot handle it. Pick and shovel must then be used, unless a different type of plow is available. Some of the illustrations indicate the size of the drifts, compared to that of the plow. In some parts of New York, as late as April 15, buses were running through tunnels, the walls of which were nearly as high as the top of their roofs.

Three distinct types of motorized snow plows have been developed, each of which has a field of usefulness in the general scheme of bus operation. Full credit for the ideas embodied in the design of these plows belongs to the bus owners serving Watertown and surrounding territory, and to Carl H. Frink, a plate and metal worker formerly with the Franklin Motor Car Company, in Syracuse.

It was in the winter of 1919-1920 that F. E. Dailey, operating between



## These Plows Conquer Winter's Heaviest Storms



No. 1. Dailey's fleet of plows. Both plows follow the same general design.

No. 2. The Cadillac Eight can make the snow fly.

No. 3. Front view of larger plow, on Brockway 5-ton truck chassis.

No. 4. At work in a snow drift about 6 ft. deep.

No. 5. Rear view of larger type of plow, showing the framing on the wings and driving frame.





Watertown and Clayton, made the first attempt to pull a nose plow attached to the rear end of one of his buses. This plow was of wood sheathed with metal, and would follow a straight line only with considerable difficulty, on account of the variations in the snow density due to the wind and drifts. About this time Mr. Frink came to Clayton to open up a tire vulcanizing plant, and suggested that a steel plow be built to swing under a truck amidships. This was patterned after a wood plow that F. W. Carpenter of Black River had hung under one of his buses, used to clear the line between Watertown and Carthage. The method of hanging the plow from three points was also used by Carpenter, but Frink conceived the idea of balancing the right half of the nose plow with a wing to clear the load for the left wheel. The first plow was built in the winter of 1919, at Hyde Brothers' plant, in Watertown, and mounted on a 1½-ton Duplex truck chassis. Its performance was far better than expected.

From this crude device the nose type of plow hung amidships and now operated by several of the busmen in Watertown and Syracuse, was developed and built. The original plow did duty for three winters and was only scrapped last year after the purchase of a larger and more modern type.

At about the same time the Watertown Transportation Company, operating in the city of Watertown, had developed a plow to meet its local conditions. This also was of the amidships type. Its nose could be raised and lowered to meet road conditions, by a long lever, hooked in position to keep the plow blades balanced properly. The right wing of this plow has a blade about 2 ft. high, to level off the snow as it is plowed from between the wheels. These plows are mounted on Buick Model 4 chassis and still are able to perform good work when called upon.

The snow plow swung amidships, with a balancing wing and a right-hand leveling wing, has been developed of late, to a considerable extent, by Messrs. Dailey and Frink, so as to secure a more substantial and a far easier form of control for raising and lowering the plow. Two forms of plows have really resulted and are shown in the illustrations. The smaller one is mounted on a comparatively light-weight,

high-speed chassis. It has been used successfully on the Model 57 Cadillac and the Model 15 White chassis.

These plows are hung from a false frame by rods and eye-bolts, with the push rods fastened under the spring clips on the rear axle. The plows are of sheet steel, braced with angle irons.

It is surprising what can be done with a plow of this kind, which can be built for \$200. The nose can be lowered within an inch or two of the ground and at high speed, 40 to 55 m.p.h., as shown in one illustration, can create a miniature storm.

Plows of this type are in successful operation on the route from Syracuse to Norwich, owned by Walter M.

This arrangement allows any desired depth of cut to be obtained.

An owner of one of these plows is now considering putting on a left-hand leveler so as to run counter to traffic, and push back the top of the high bank left by the right-hand wing. With this leveler he believes he can materially increase the usefulness of his plow.

#### DAILEY'S HEAVY DUTY PLOW

The plow built for F. I. Dailey, who operates from Watertown to Clayton and Alexandria Bay, is mounted on a 5-ton Brockway truck with nine forward speed. In reality, it has a complete overgear transmission for high speeds. The power



*Amidship-hung balanced nose wing plow. Note the balancing wing clearing a path for the left wheel. Three point suspension keeps the crowned road surfaces to be easily reached.*

Aldrich; by F. I. Dailey, on his Watertown, Clayton and Alexandria Bay Line; by the Carpenter Bus Line, Inc., between Carthage, Watertown and Adams, and by Haas and Larabee from Alexandria Bay to Watertown via Theresa.

#### AMIDSHIPS NOSE PLOWS FOR HEAVY DUTY

The heavy-duty plows follow closely the smaller type used on the Cadillac chassis. One exception perhaps is that the clearance under the axles is increased by using oversize tires in order to better navigate the deep snows, and at the same time to get the radiator higher up and keep it from overheating when it is enveloped in snow. The nose is hung from a false frame of oak or ash suspended at three points, with control by hand wheels and springs on rods hooked to the floor with eye-bolts,

plant is a Buick engine, with 5 x 6 bore and stroke, driving through a double gear set, the heaviest type of Timken worm-driven axle for use with pneumatic tires. In operation Mr. Dailey says he can get approximately 20 m.p.h. per gallon of gasoline.

This plow was built in the latter part of 1921 and put into service on Jan. 3, 1922. Its chassis has pneumatic tires all around, 19 x 8 on the front and 11 x 19 on the rear. The radiator is set on blocks, so it stands 4 ft. from the ground. With good tire chains the plow can be operated successfully through 4 or 5 ft. of snow. It can cut a swath 11 ft. on the road surface, the right wing being extended to cover nearly 6 ft. of surface. The wing has a maximum height of 8 ft. from the street. One of the illustrations shows the plow in a large snow bank.



*Head-on view with wings spread out to full width of 22 ft. Inside framing of nose plow is of heavy angle iron. Amidships wings fold back on truck frame*

The plow mechanism is also mounted on a false frame, extending diagonally across the chassis from the rear of the driver's cab and directly over the right-hand end of the rear of the rear axle. The nose is braced to the rear axle housing by another frame under the rear axle.

In order to get the necessary weight on the rear wheels to keep the wing plow in position to push the snow instead of the reverse, 4,500 lb. of ballast in the shape of sand in bags is carried. The plow equipment weighs 4,000 lb., so that the rear wheels carry about 15,000 lb. with the ballast concentrated over the rear axle.

In operation two plows are usually run as a team; the big plow leads, and a smaller one mounted on a Cadillac chassis but of the same

general type follows to clean up whatever snow rides over the nose of the larger plow. Of course, many snowfalls can be handled by the smaller plow alone.

#### ANOTHER AMIDSHIPS PLOW

One of the illustrations shows the plow used by H. H. Vrooman on his Watertown, Lowville, Copenhagen Bus Line. This plow is mounted on a Model 50 White bus chassis and has proved dependable. In heavy drifts a 10-ton Holt tractor is hooked on ahead as a tow. With this extra power no difficulty has been experienced in bucking the heaviest of snow drifts. It takes time to break open the line once it is closed, but the equipment stands the abuse necessary without failure. As evidence that the equipment would stand the

abuse it is now in regular duty under a twenty-five-passenger body.

The illustration gives a good view of the comparative size of the balance wing or left-hand side of the nose plow hung amidships, which clears a path for the left rear wheel. This plow, as will be noticed, also has a three point adjustment for raising and lowering the mechanism. One is on the nose, another on the tip of the balance wing, and the third is on the leveling wing. Hand adjusting wheels are 13-in. diameter and are threaded to work over suspension rods attached to the plow blades. Nose plow and wings are independent of adjustment to a distance of 0 in. to 10 in., depending upon the clearance under the chassis forward of the rear axle.

The plow mechanism is pushed from the rear axle housing by heavy angle bars, hinge-jointed to the spring clips. These drive bars are strongly bridged, as shown in the illustration, to prevent misalignment of the plow with chassis and also to relieve any side strain on the suspension bolts.

The false frame, which supports the plow mechanism is built of hard maple or ash, and serves to give proper height for hanging the plow. With a plank flooring installed ballast can be carried as required.

#### TRACTOR-DRIVEN PLOWS

A most powerful form of plow has been developed by the Carpenter Bus Lines, Inc., for use on its two routes out of Watertown. On the front is mounted a scoop type of nose plow that not only lifts the snow but breaks it up and turns it to the roadside. Then by means of wings and top levelers on either side it is pushed into gutters and ditches.

Prior to this design the Carpenter Lines had experimented with a rotary form of plow, without marked success. Even a 150-hp. marine type of gas engine failed to keep the rotary fan revolving at sufficient speed to clear a path for the truck traveling at its lowest speed. With snow of considerable volume the fan slowed down and became clogged.

After the rotary plow had failed in a storm of considerable severity, a wooden form of vertical nose plow that could be fastened onto the horns of the truck and braced back to the frame was hastily constructed. This temporary plow was the basis of the new design. To overcome the difficulty of steering, owing to uneven-



*Looking down on top of nose, where framing is designed for stability*



ness of snow density, the scoop form of nose plow was used. This type breaks up the snow, and enables the driver to keep going straight.

Carpenter's plow has a 5-ton Linn crawler-type truck as the foundation for the scoop nose and wing plows. The  $4\frac{1}{2} \times 5\frac{1}{2}$  engine is a Continental four-cylinder of 40 hp., and the wheelbase measured from the front axle to the rear axle is 135 in. The vehicle has three speeds, and on high speed can travel  $5\frac{1}{2}$  m.p.h. The tractor has 1,120 sq.in. of crawler contact surface. With the plow equipment, which weighs 6,300 lb. (3,300 lb. for the nose and 3,000 for the wings), the vehicle itself 8,600 lb. stripped, and ballast of 10,000 lb., the weight is about 2,800 lb. per sq.ft. of road contact surface, sufficient to move snow to a depth of 96 in. without being deflected in the least. All told, the tractor carries 8 tons plus its own weight.

The plow parts, blades and wings, are of No. 12 gage boiler plate, reinforced with angle irons of varying sizes to keep the blades in shape, and also to carry the load back to the truck frame.

*Side view, showing wings can be operated in different positions. Top leveler cuts off curl from lower wing.*

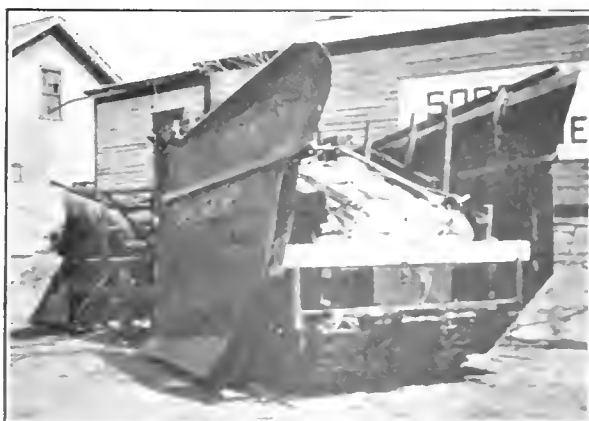
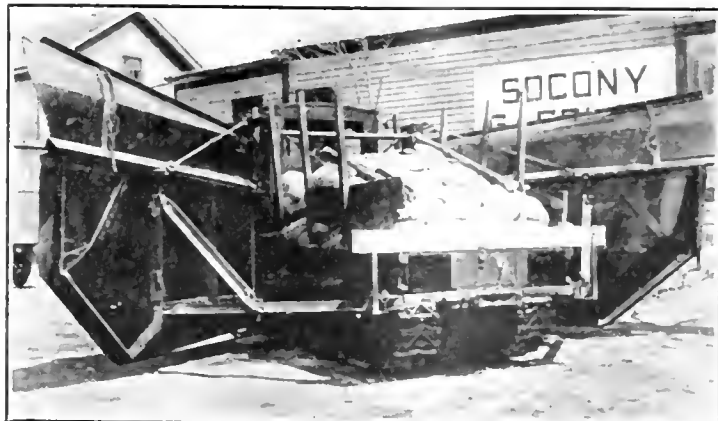
The supporting frame for the nose plow is of 6-in. angle iron, and as will be noticed from one of the illustrations, extends across and is fastened to the frame horns in front of the radiator. This is strut braced at a 45-deg. angle to the lower ends of the scoop, and also to the lip of the scoop. The 4-in. angle iron braces, which are placed on each side at the back of the scoop frame, extend to the truck frame outside of the front wheels. Thus they can carry the load impressed upon the scoop and nose plowing into the snow, and at the same time do not interfere with turning the front wheels. The scoop and nose which ride on skid shoes or casters are thus substantially an integral part of the truck frame and are not liable to crumple unless the

fastenings to the truck frame are shearing.

The scoop at the front is 106 in. wide, rising at an angle of about 25 deg. to a height of 36 in. A razor-back nose plow is super-imposed on the scoop and set back 10 in. from the cutting edge so that as the snow is first lifted, it is broken up and half thrown to either side. The height of the nose above the ground is 60 in. and the maximum spread of the nose lips is 135 in.

The side wings are hung with pivots on a false frame, fastened in the rear of the cab to the body flooring, so that each wing can be swung outward and secured with rods and pins. Stability is obtained through iron rod braces with right and left turnbuckles as shown in the illustrations. The side wings themselves are in two parts. The lower portion has a blade with a straight scoop edge beveled off to break through crusted snow. The lower wings are 5 ft. high and 10 ft. long, while the top levelers or upper wings, which set on top of the lower ones are 18 in. high, with a curled lip at the top. These top levelers can be set in sev-

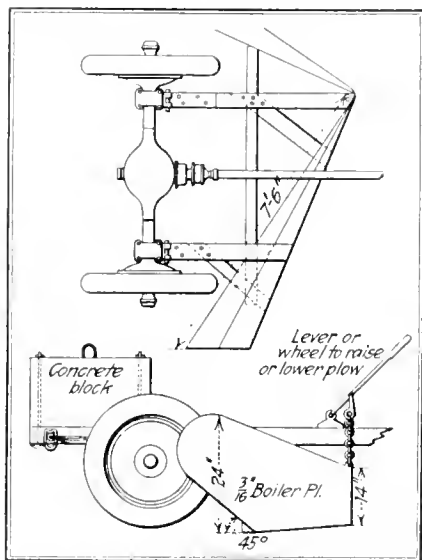
*Rear views, wings spread wide open and folded back. Bracing used on wings, and struts hold them in position.*



eral positions according to the height of the snow. With the wings set out as far as possible the plow can clear a swath of snow 22 ft. wide at the top of the bank and 17 ft. at the road surface.

Mr. Carpenter plans to improve the cab arrangements so as to provide more comfort for the driver. It is to be fully vestibuled, heated, and made as stormtight as possible. The present stake body is to be further inclosed, and fitted with stove, table and bunk, so hot meals and rest can be available for the drivers while the plow is on duty. Two men usually man the plow, either of whom can drive it.

In order to get the proper amount



Layout of plow developed by Watertown (N. Y.) Transportation Company

of weight for traction purposes, Mr. Carpenter proposes to substitute a 5-ton block of concrete and iron and do away with the sand bags now used as ballast. This or another scheme to secure weight will be necessary because the housing quarters will require a part of the space heretofore used for carrying sand bags.

An extra 20-gal. gasoline tank is to be provided so as to allow twenty-four hours of service without replenishing. Fuel consumption averages about 3 miles per gallon and with the present tank which holds but 20 gallons the plow has a maximum working period of but twelve hours.

Mr. Carpenter is enthusiastic about this type of plow. It is needed, he says, not on account of the amount of any one snowfall, but to handle

## The Snow Fighters

BY JOHN DESMOND

Conductor Fifth Avenue Coach Company,  
New York City

'Twas a dreary, dark December's day,  
And the clouds hung low overhead;  
And the sun seemed to hide each warm-  
ing ray,  
And the winds blew along in their hur-  
ricane way,  
And the streets that once looked lively  
and gay,  
Now looked dismal, gloomy, and dead.  
And our foreman standing, with knitted  
brows,  
Underneath an electric light,  
Told the clerk in charge to send out the  
plows,  
As 'twould surely snow tonight.  
Then the plows came out and each sec-  
tion told  
Where to work; and each man well  
knew  
As he dressed himself for the bitter cold  
In his oilskins, just like a mariner bold,  
Preparing to enter a shipwrecked hold  
To save a despondent crew;

And into the silence, into the shade  
Of the buildings tall. And now  
And then not a sound but the swish of  
the blade  
Of the great Fifth Avenue plow.  
As it plowed through the streets like a  
mighty bird,  
There in silence through the night,  
Its crew worked on without speaking a  
word,  
For their task they knew, and no voice  
was heard;  
And the blade of the plow, like a gleam-  
ing sword,  
Cleared the snow ere the morning's  
light.  
They seek no praise, for their task is  
done,  
Their work is beyond reproach.  
They were sent out to fight the snow;  
they won,  
Men of the Fifth Avenue Coach.

From the "Motor Coach"

the drifts. In fact, it is not unusual to be able to see only the sky, for the snow is piled up higher than the top-most wings of the plow after the road has been opened.

The cost of fitting up such a chassis with scoop, nose and wings is about \$1,500.

### Rented Plow Saves the Day

AFTER a snow blockade lasting several weeks, the highways between Norwich, New Berlin and Mount Upton, N. Y., were opened last winter with the help of the apparatus shown in the accompanying photographs. This is manufactured and owned by the Linn Manufacturing Corporation, Morris, N. Y., and was used as a result of efforts made by J. A. Wild & Son, bus operators of South New Berlin, to clear their route. A cut of 20 ft. wide was made throughout the greater part of the route, with the exception of a

few places where the snow could not be cleared to a width of more than 10 ft.

The machine used is a 10-ton Linn truck-tractor, and was loaded with 3 tons of iron. At the rear this has "caterpillar" tracks each 40 in. long and 14 in. wide, while front wheels were replaced by runners. The snow-clearing apparatus is a V-shaped plow with adjustable wings on each side. This tractor, it is said, uses about 2 gallons a mile and was rented for the sum of \$40 a day.

An organization, made up of the Norwich Motor Club, Norwich Chamber of Commerce, and various business men of the city appropriated \$100 to help defray the expenses of Wild & Son in their successful effort to open the roads for traffic between the two valleys. As a result of this experience plans are being made, to keep the main arteries of travel in the neighborhood open the coming winter, regardless of snowfalls.



Front and rear views of 10-ton Linn tractor used in snow-fighting by Norwich (New York) bus operator

# Modern Practice in City Snow Fighting

How the Fifth Avenue Coach Company Cleans the Twenty-five Miles of Its New York City Routes—Organization and Planning Are the Foundation of Its Success

THE bus operator who is determined to make good by giving service day in and day out during the coming winter will find inspiration, and direct help as well, from the organization and methods that have been developed after years of experience by the big Fifth Avenue system.

New York City, the scene of its operations, has widely varying snowfalls. In 1919-1920 there was only about 3 in. during the whole winter. Two years before that, however, the total was practically 50 in., and last winter it was 54 in. But the bus system must be prepared, of course, for the worst and not for the best conditions.

Another thing that makes snow fighting difficult is that more than half its mileage is semi-exposed. On Riverside Drive between Seventy-second and 135th Streets, and on Fifth Avenue between Fifty-seventh and 110th Streets, one side is faced by towering apartment houses and palatial residences. The other side is open, however, and many deep drifts are formed by snow that sweeps against the walled side of the street, swirling and eddying back into the roadway.

Then there is the traffic, which is heavy along most of the line, even in winter. For years the traffic situation on Fifth Avenue was complicated by the method of cleaning. The snow was first pushed into the center of the street, leaving narrow one-way lanes on each side, which had to care both for parked and moving vehicles. Last winter, however, the City Street Cleaning Department changed its method and worked toward the curbs and the bus equipment could do likewise, resulting in much better conditions for traffic.

Snow fighting started back in 1915 on the Fifth Avenue system, when the company decided that it was a matter both of business and of fairness to the public to give continuous service and to avoid complete tieups which had occurred during earlier years. The city is supposed to clean off the streets over which the Fifth



*Cleaning up on Riverside Drive, with bus for passenger service right behind*

Avenue buses travel, but its apparatus has much work to do, which takes time, when the buses might be blocked. Consequently the company has built up its own organization, and is prepared, if occasion demands, to keep all its routes open for service. This means cleaning the entire pavement, or an average of 50 ft. wide for the 25 miles. In the last eight years about 6,000,000 cu. yd. of snow (more than 1,000,000 cu. yd. in bad winters) have been cleared from the routes.

As has been said before, the system of handling this work and the equipment have developed by hard experience. The first plow was the so-called trailer, or pull type, of which there were thirty-seven in service a few years ago. These were really road scrapers towed by buses taken out of passenger service. This method was found extremely expensive, as a thorough overhaul was required after the final snowstorm each year to get the buses back into condition.

The next step, therefore, was to build a motorized plow. De Dion chassis, imported from France for bus service, were remodeled and a scraper blade with hand-wheel adjusting mechanism installed amid-

ships. Of these ten were built in 1920 and are still in service.

Something more powerful was required, however, and this has been obtained in the shape of a four-wheel-drive truck, with two scrapers, one mounted in front and the second amidships. Six of these were in service during the winter of 1922-1923, and seven more will be used during the coming winter. To distinguish the latest type from the others, it is called a "Hy-Power" plow. The main part of the snow fighting will be handled in future by the "hy-power" and power plows, although some pull plows will be kept ready for service in severe storms. Last winter when the snowfall was unusually heavy the power equipment handled all the work, and the pull plows were not used at all.

## ORGANIZATION FOR SNOW REMOVAL

The finest and best snow-fighting equipment would be of little value unless backed by the right system to put this equipment into service at the right time, and then to keep it going until the storm is over. On the Fifth Avenue line this is handled by a "Snow Order" which is simply a typewritten statement giving complete rules and instructions as





Close-up of Walter four-wheel-drive plow. Two Champion blades are used—  
a front blade 10 ft. wide, and one mounted amidships 12 ft. wide

to how the work is to be handled. This is issued at the beginning of each winter, and copies go to those who take part. The 1922-1923 order, for instance, starts out by fixing the responsibility for putting the snow order into effect. This takes place usually when half an inch of snow has fallen. In the day time the initiative is taken by the office of Superintendent of Transportation J. W. Mullahey, whereas at night the general night foreman of garages (G. G. Harmon) has this responsibility.

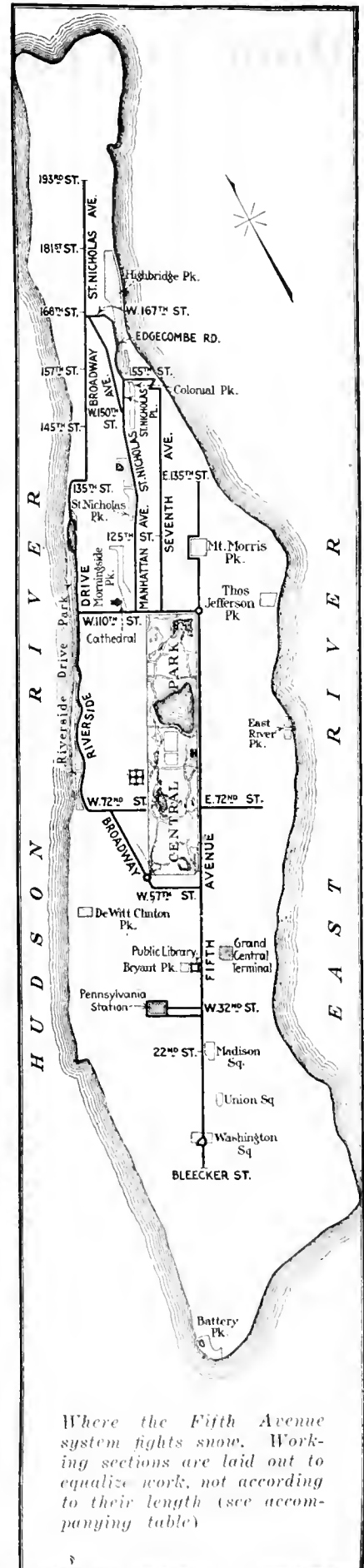
Immediately the order goes into effect, the men required to take charge are notified either by telephone or messenger, if they have not seen the snow start and reported for duty. Many of them live near the company garages so that they can be quickly reached. Meanwhile the plows have been moved to the garage doors, engines are turned over, ready to send out at once, according to instructions given in the snow order.

This provides for two plans of operation, the second of which is used

only under severe conditions and on orders from the office of the Superintendent of Transportation. Plan No. 1, as used last winter, is shown in the accompanying table. This describes routes to be followed by the "Hy-Power" and power plows, sixteen in all, and indicates from which garage they shall be supplied. It will be noticed by comparing the table and the map, that the 102nd Street garage (No. 3) furnishes plows for the line from Washington Square to 110th Street and Fifth Avenue, while from the two garages at 132nd Street come equipment for the remainder of the lines.

The second plan provided for the use of ten pull plows in addition to the sixteen power vehicles, with a slight change in the location of routes which they work. Last winter the plows worked in fleets of two so that a windrow of snow was left about 5 ft. out from the curb, which meant another trip for one plow to push it back.

With the new equipment, however,



Where the Fifth Avenue system fights snow. Working sections are laid out to equalize work, not according to their length (see accompanying table)

Plan (No. 1) for Snow Fighting on Fifth Avenue Lines

Section No.	Supplied By Garage No.	Location of Route	Number of Plows	
1	3		Hy-Power	Power
		Washington Square to 34th St. on 5th Ave. incl. Penn. Station and Astor Place.	1	1
		34th to 59th St. on 5th Ave.	1	1
3	3	59th to 110th St. on 5th Ave. incl. East 72nd St.	1	2
4	4	110th St. and 5th Ave. to 8th Ave. to 7th Ave. to 168th St. via 7th Ave. and Edgecomb Road	1	2
5	4	110th St. and 8th Ave. to 193rd St. and St. Nicholas via Manhattan and St. Nicholas Ave.	1	1
6	5	57th St. and 5th Ave. to 96th St. and Riverside Drive via Broadway and Riverside incl. West 72nd St.	1	1
	5	96th St. and Riverside Drive to 168th St. and Broadway via Riverside and Broadway	1	1
8	5	110th St. and 5th Ave. across 110th St. to Riverside to 135th St. and Broadway	1	1



the plows will travel in gangs of three, and finish half the roadway at a time. This will give seven blades to each fleet or gang. One of the De Dion plows, with a single scraper, will go first to break the way and will be followed by two four-wheel drive plows, each having two blades. Thus as the snow piles up the more powerful equipment will be lined up in the best place to handle it.

Division superintendents have charge of the plowing in each section, and in addition the office of the Superintendent of Transportation keeps closely in touch with the situation by two observers, one for day and one for night patrol duty. To each one a motor car and driver is assigned, and they ride back and forth over the line, noting any changes that are required, where additional men or equipment, such as sand, ashes, brooms and shovels are needed, giving a helping hand here and a word of encouragement there, and reporting frequently by telephone to the office of the Superintendent of Transportation. That this work is done effectively can be testified to by one of the editors of *BUS TRANSPORTATION*, who spent the best part of a Sunday last winter on board this patrol car, observing the methods described in this article.

#### PRECAUTIONS ON BUSES

The actual plowing, while one of the most important parts of the work, still is only a part. Buses must be made ready, and other precautions taken. As indicated in the snow order, each bus must be supplied with a shovel, box of sand, and two chains, not later than Dec. 1. Sand cars, or heavy-duty trucks, are fitted to carry sand for bad places along the line. Five of these are used, each having a section of the line to cover. Before a sand car goes out, its destination must be telephoned the City Street Cleaning Department. Permission must be obtained from the department before ashes are used, as is necessary sometimes in severe storms, so steps can be taken to prevent their clogging up the sewers.

Extra men are stationed at the terminals and transfer points, to assist dispatchers in cleaning steps of buses, destination signs, and sidewalks used by passengers.

It will thus be seen that the company goes to great lengths in its snow fighting. Snow plows may be used only a few times a season, and

yet an annual license fee of \$40 must be paid for each vehicle. The equipment, such as plows, devoted to snow fighting alone, represents an investment of well over \$150,000, and the overtime wages average \$20,000 a year, all used mainly to retain the good will of patrons. In spite of this, the company is going ahead, improving its equipment, and taking better care of its patrons each year. Men are assigned to the sections in advance so they will know where every car track, manhole cover or other obstruction to plowing is located. During the winter constant commu-

ication is had with the local weather bureau, but more information has been found necessary, and so the office of the Superintendent of Transportation contains a recording thermometer and barometer, as well as experts in their use, the presence of which is certainly conclusive proof that the Fifth Avenue Company has adopted one of the most important features in successful snow fighting

which is to start early. Keep ahead of the snow, and don't let it get ahead of you. Put out too much equipment perhaps, but play safe. It saves money, making for results to the end.

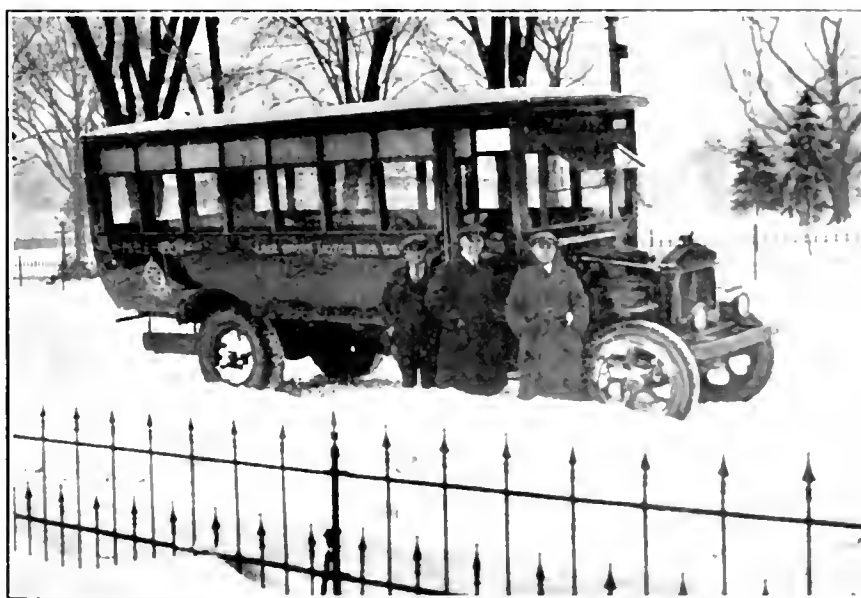
## Where Snow Flies and the Buses Also

THE Lake Shore Motor Bus Company, Toronto, Canada, for the last four years has been operating from that city to Hamilton, 40 miles away on the Ontario Provincial Highway. Five buses are used, two fifteen-passenger Reos and three twenty-five-passenger Pierce-Arrows. The schedule calls for trips from one to two hours apart. About six round trips are made each day. The start is from the Sunnyside Station, in the western part of Toronto. The Hamilton terminal is at the intersection of two important streets in the very heart of the town. Most of the business is to Oakville, 20 miles out. Here are many country homes of Toronto people who prefer the bus to the train, in the absence of through trolley service. Not many passengers go all the way to Hamilton, however, be-

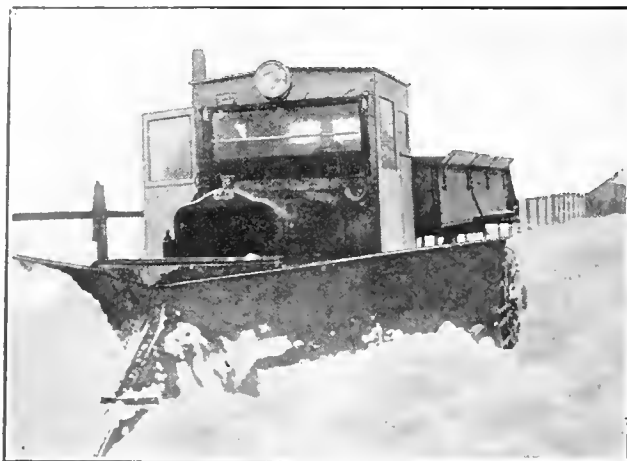
cause the railroad gives more rapid and frequent service.

On the one-way basis the fares are about 3 cents a mile. One-way rate to Oakville is 60 cents, and to Hamilton \$1.25, while round-trip rates are \$1 and \$2.25, between the two places. A book of ten tickets is sold at a slightly reduced price.

Until Jan. 1, 1923, business was just about as good as during the summer. Early this year, however, there were a number of heavy snowfalls. The Highway Commission is supposed to remove snow from the road followed by the buses, but its plow often did not start work until 10 a.m., or three hours after the first bus was scheduled to leave. The buses therefore bucked the snow as well as they could with chains, and service was kept up to a surprisingly good degree throughout the winter.



*Pierce-Arrow operated out of Toronto on 40-mile run along Lake Ontario*



*At left, snow plow used in keeping the road clear from Hibbing to Duluth. This truck with several similar outfit is started out as soon as the snow begins falling. At right, bus passing through a drift higher than the bus itself*

## Winter Operation in the Frozen North

**Minnesota Bus Operators Get Help from County, but Also Use Ten-Ton Tractor, Which They Own Jointly—Snow Fences Placed in Position Each Fall**

**B**ATTLING, in every sense of the word, and conquering, too, motor bus lines in northern Minnesota, operating between Duluth and Hibbing, have established themselves firmly as a quick mode of transportation the year around, especially during the heavy snow storms of the severe Northern winters when they often plow through snow drifted 18 and 20 ft. deep on the roads and with the temperatures at 35 and 40 deg. below zero for weeks at a time.

The bus lines have proved a boon to the country and the people they serve and a paying investment to the operators of the lines, who year by year are increasing their service and pressing larger and more luxurious vehicles into service. Although the industry is still in its infancy, being only nine years old, its popularity seems to assure the hardy spirits guiding the operations of future success which bids fair to rival the success of the railroads.

All credit is due to the bus line operators who have worked with ardor to give northern Minnesota the efficient service it now has through the bus lines. Most of the men connected with the companies are pioneers in this district and have had personal contact with the hardships that beset the farmer and homesteader through more

than six months of cold winter each year, when many a farmer and his family were isolated from civilization for months at a time, snow-bound, with roads impassable.

The trip from Duluth to Hibbing could be made in around seven hours during the early days and in the summer only. Before that it was a two-day trip, and a night camping on the road, by team. And a team trip meant many hardships even during summer, and was seldom ever attempted during the winter months.

But with the introduction of modern passenger buses, tractors,

paved roads, and the always-with-us American spirit of adventure which makes men love to risk their lives fighting the elements in a pioneer service for their fellow men, the unbelievable became a reality.

### ROUTE FOLLOWS LAKE SUPERIOR

Today a talk with the men whose duty it is to keep the roads open in order that the buses may run on schedule, will convince anyone that it is not only the fact that the bus lines must be kept running all winter that keeps them working for hours at a time, day and night, in



*The dog team pictured here with the mail bus was one of the famous Canadian Derby teams purchased by the Minnesota Forest Service. Teams like the one here formerly carried all mail into Grand Marais*

all kinds of weather, but it is the realization that they may find at the next crossroads some settler or homesteader who is waiting for the bus in order to get food, or medical attention or other necessities of life.

The White Bus Lines serve the people of the district in a novel manner. They operate between Duluth and Grand Marais, and points along the line, which runs up the north shore of Lake Superior, carrying passengers, supplies and the United States mails. Weather of the severest sort hits this section of the country along the road to Grand Marais, which follows the shore line of Lake Superior, getting to the fullest the furious blasts from the largest fresh water body in the world.

Formerly the mails were carried by dog team in the winter and by boat during the summer. Then service was given twice each week if the winter was not very severe, but now the bus line goes to and from Grand Marais twice each day, and despite the weather, is seldom late or misses a scheduled trip.

#### ONE MILE PER GALLON

Grand Marais is the county seat of Cook County, Minnesota, and one of the rules of the postal department is that the mails must be delivered each day. And there is no railroad connecting the town with the outside world. But so far the buses have never failed in delivering the mail or supplies. To give an idea of the determination of bus drivers and the company operators to maintain the service, one bus last winter used 100 gallons of gasoline to go a little more than 100 miles through the snow-covered roads without the aid of a tractor-snowplow or the help of any other road-opening truck.

Northern Minnesota is completely served by motor buses. Nearly every town, hamlet and crossroads north of Duluth is visited on the scheduled trips of the commodious and heated buses. In summer, tourists flocking to the region for a view of the largest iron ore mines in the world or to escape from the heat of other sections of the country, use the buses for sightseeing trips, and for quick transportation, as the running time between Duluth and the Range cities is almost an hour shorter than that of the fastest train to the section.

The bus companies keep the roads clear in winter with the exception of one road, the Grand Marais-Duluth, which the county keeps clear because of the mail carrying bus. But even here the bus operators aid with their own snow-clearing equipment.

#### OPERATORS CO-OPERATE

St. Louis county keeps the road from Duluth to Grand Marais passable in winter with three Holt "caterpillar" tractors, and large gangs of laborers. Bus drivers during winter always carry large snow shovels, which they are always forced to use as stiff winds

panies have erected snow fences in order to keep the snow from drifting over the road.

The snow fences are stored in piles along the road during the summer and are put out in the fall before the first snowfall. They are placed in a manner similar to the steam railroad snow fences, and are a big aid in keeping the road free from excessive drifts. In spite of these two precautions, however, the snow will drift and then it is the work of the 10-ton Holt tractor, owned jointly by the bus companies, to force a passage for the buses.

The caterpillar tractor will clear through all the drifts usually in the



*Mail piled high over the front of the White bus. This load was carried into Grand Marais last winter.*

continually shift the flaky snow and cause large drifts to accumulate on the roadway.

Roads running between Duluth-Hibbing, Virginia-Eveleth and other towns are kept open by the bus companies entirely without the aid of the county machines. The several companies operating buses combine in fighting the wintry elements to keep the roads open for travel.

From Duluth to Virginia and Eveleth and Hibbing, a paved road, the Miller-Trunk highway, runs for a distance of 60 miles, of a total distance of 87 miles between the cities and Duluth. When this road was paved last summer engineers made special note before laying the route, of where the snowdrifts were apt to fall and these places were avoided wherever possible. With this preliminary help the bus com-

60-mile stretch from Duluth to the end of the paving, in twenty-four hours.

In addition to this as soon as a snow starts in the winter, trucks with snow plows attached on front are kept busy running up and down the roads keeping the snow cleared and the road open for travel. This is a big help, and unless the snow is too heavy usually suffices to keep the roads passable.

The Miller-Trunk highway, the paved road from Virginia to Duluth has no special treatment to protect it from the cold weather.

Last winter was of average severity with one big storm which tied up train traffic for two days. But the bus service was only delayed twenty-four hours, the companies pushing their plows out and clearing the road well enough for

the passenger buses to travel, within that time. This record was considered as remarkable by northern Minnesota people, who in years past have not attempted to push through the roads for days after severe storms, which often keep them holed in their farm homes for weeks.

Two years ago was a particularly severe winter, but the bus companies went through with less delay than the trains.

The Messaba Transportation Company, which is the pioneer operating company on the range, has been running buses for nine years and up to two years ago never had more than a twenty-four hour delay in its schedule during a winter.

After six years of building the interurban bus service between the Messaba Range cities, the Messaba Transportation Company put one bus in operation between Duluth and Hibbing. This car left Hibbing in the morning to arrive in Duluth at noon, after which it left on the return trip to Hibbing. From the start the venture was successful, and paved the way for the present system of motor transportation, consisting of forty-five buses, operated the year round.

At that time, three years ago, the buses ran over the Miller-Trunk Highway from Duluth to the Iron Range cities. With the increased popularity of the service between Hibbing and Duluth the company added more buses, until now eight make two round trips from Hibbing to Duluth.

And then there are seven twenty-four passenger buses, running between Hibbing and Virginia, and Hibbing and Grand Rapids.

On the original run of the companies' lines, the pioneer effort that started the Messaba Transportation Company, a bus left Hibbing for Grand Rapids making one trip each day. Now buses start from both Grand Marais and Hibbing at every hour from 7 a.m. to 6 p.m. each day, with two buses running in the evening.

The White bus lines operated by the Messaba Motor Company have placed big passenger coaches in service between Duluth, Minneapolis and St. Paul, a distance of 160 miles. These trips were not continued all last winter, but will be carried on throughout the present year. The White bus lines operate out of Duluth and have a large

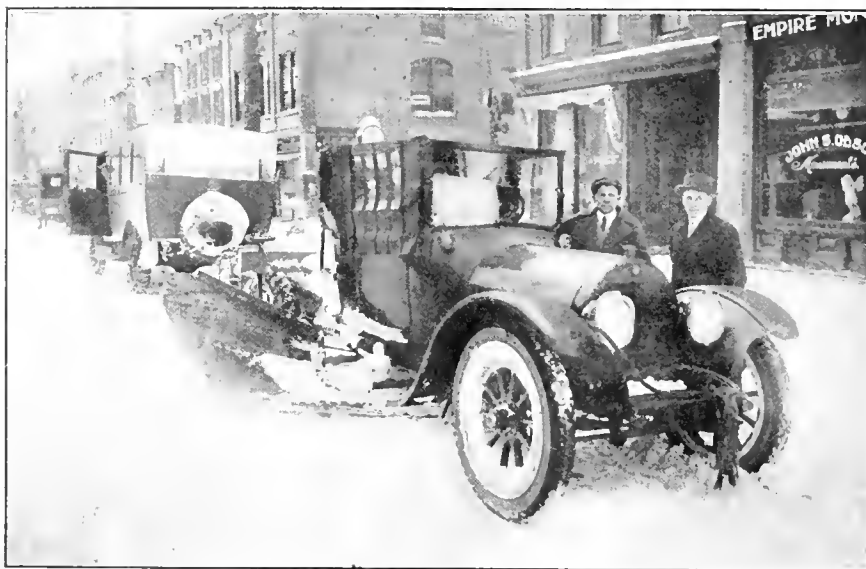
number of buses in service. They have a line running between Duluth and Eveleth and Virginia and from Duluth to Grand Marais.

Although big, carrying many passengers and traveling at the comparatively high speed of 35 to 40 m.p.h., the gasoline consumption is low. For the most part the unofficial reports on the consumption show averages from 15 to as high as 18

miles per gallon. In winter when traveling under difficulty of deep snows the consumption is much higher.

To sum up the fight of the bus companies to operate in northern Minnesota with weather and roads in most cases against them, the record they have set up for continual service is better than the railroads operating in the district.

## New York State Operator Fights Snow with Passenger Car



*Cadillac snow plow is used on line into Syracuse, N. Y. Mr. Aldrich, the owner of the line, is wearing a cap*

WALTER M. ALDRICH, operating between Casenovia and Syracuse, N. Y., is using the Cadillac passenger car, shown in the illustration, to keep his route clear of snow. The route is 18 miles long, and includes a number of severe hills. Last winter was one of the worst experienced in New York State for a number of years. Despite the deep snow Mr. Aldrich was successful in keeping open a roadway, 14 ft. wide, through drifts in some places 10 ft. deep.

The method followed has been to take the plow out as soon as snow begins to fall and keep it out until the snow stops. Plowing speed varies from 25 to 40 m.p.h. The plow blade is made of heavy iron, reinforced with boiler plate along the bottom.

Mr. Aldrich says that the plow has been found satisfactory for ordinary work, but it has not enough power for very deep snowfalls. He has had to use two Cadillac cars in front of

the one carrying the plow, but next year he expects to keep the roads open from Norway to Syracuse, a distance of 65 miles, by means of a tractor of the caterpillar type. This he expects will draw a plow through any drift that may be encountered on the route.

## New Signal Device for Traffic "Cops"

EVERY Denver, Col., traffic officer becomes his own semaphore when a new system for controlling traffic at crowded corners is put into operation in that city. A. G. Paine, an automobile man, has invented a leather belt with a red light on front and back controlled by electric batteries which is to be worn by traffic policemen. Whenever the traffic officer signals traffic to proceed north and south, his "fore and aft" will flash out red lights to warn all motorists journeying east and west to halt.

# Planning Maintenance Facilities

Important Features of Garage and Shop—Selecting the Location—  
Requirements and Layouts for Building Construction—Heating,  
Lighting and Ventilating—Fire-Fighting Apparatus

**I**N A restaurant the most highly paid member of the staff is the chef. It is not the cashier handling the money, not the people out front in contact with the public, none of these. The man who gets the coin is the chef, who buys, handles and doles out the food. And he is the one whom the boss takes good care of when it comes to equipment, from the smallest pot or pan up to a multiple-cylinder cooking outfit, or whatever is the name of the thing at the big end of the equipment scale.

The reason for this is simple: The chef's department gets the most because it can lose the most. Here is represented the difference between profits and loss, unless the chef's work is rightly handled.

Is there any great difference between the maintenance end of a bus system and the chef's department of a restaurant, as just described? The bus operator who studies his costs knows that 30 to 40 cents of every dollar he takes in goes for labor or supplies in his garage and shop. And this figure may be even greater unless extreme economy is practised. Then, in addition, there is the direct loss in income from vehicles out of service when they could be rolling, and this all comes back to the maintenance facilities, or to their ineffective application.

All of this merely emphasizes something that every bus operator realizes; that is, the necessity for careful planning of maintenance facilities. The need applies equally to the shop built from the ground up for bus service and to the one that has been rebuilt or converted, for storing and repairing the bus fleet. It is proposed in this and succeeding articles, therefore, to discuss some of the fundamentals of maintenance facilities and to illustrate these by reference to practices of operators in various parts of the country.

## SELECTING THE SHOP LOCATION

The site for the bus maintenance shop must usually be a compromise. First consideration is usually the obtaining of an adequate structure



*Nos. 4 and 5 Garage of the Fifth Avenue Coach Company, New York. Entrance at grade permit bus storage on two levels, with street level.*

without undue expense. This means that the cost of the land must not be too high, and grading, excavation, tearing down old buildings, etc., must not be too expensive. The next thing is to keep dead mileage down to a minimum, which means the location should be near one of the terminals of the route, or in larger systems, where routes go in many different directions, at the center of gravity as determined by location of routes and schedule requirements. An advantage, of course, of the shop on or close to the main route is that buses can stop easily for inspection or filling.

Convenience in the receipt of supplies may settle the choice of a location. Access to railroads sidings, for example, may be desirable, particularly with large fleets, for which supplies can be bought in bulk and unloaded directly from the railroad. The fifty-bus garage planned for St. Louis will be on a three-cornered plot lying alongside one of the main railroads, with a 15,000-gal. gasoline tank placed underground close to the track, where gasoline may be unloaded directly from tank cars. This is not possible in New York City, where the ordinances require that all gasoline must be handled in drums.

The uptown garages of the Fifth Avenue Coach Company present an example of how the contour of the

land has been taken advantage of in laying out the building. Nos. 4 and 5 garages, which are entirely separate although in the same building, lie between 132d Street and 133d Street, which slope on a 6 per cent grade to the Hudson River. As a consequence it was possible to dispense with elevators or ramps and build a two-story building, with each story having an entrance directly from the street. This location is well calculated to cut down dead mileage, since most of the routes followed have their terminals in the section just north of these garages.

All this applies to the general location. After this has been selected the minor details must be considered. There are the local ordinances, which often insist that buildings in which gasoline vehicles are stored must be kept a certain distance, 20 to 50 ft., from churches, schools, and other places of public assemblage.

A site on a corner, thus giving entrances on two streets, or one between streets where buses can drive directly through, may be obtained. If a corner is used it is wise to place the main doorway on the street of lighter traffic. In general, streets carrying heavy traffic or those on which trolley systems are operated should be avoided, particularly if there is not much outside maneuvering space between the building and property line. Of course, where land

is not high it is possible to leave plenty of space outside the building, and this may compensate for the prevailing congestion on the street.

From the standpoint of the bus operator, utility is undoubtedly the first thing he looks for in the building. Attractiveness of the exterior is in general a secondary requirement. Looks are of more importance when the shop is on one of the bus routes where it is being seen all the time by passengers. It is then desirable to have a building that will attract favorable comment by appropriateness for its work, as well as by being in keeping with neighboring buildings. Then if the building and its surroundings are kept clean and in good working order the shop cannot fail to add to passengers' good will.

The public, however, has even more to say about such buildings than the bus operator. Gasoline is regarded as introducing both fire and explosion hazards, so that protection "from" as well as "for" the vehicles in the building must be provided. Of late years, therefore, there has been a tendency to stiffen up building codes for garages and to insist upon fire-resistive construction, particularly when other buildings are near by. An example of this is found in a model ordinance for small municipalities, which is fathered by the National Fire Protection Association. This reads as follows:

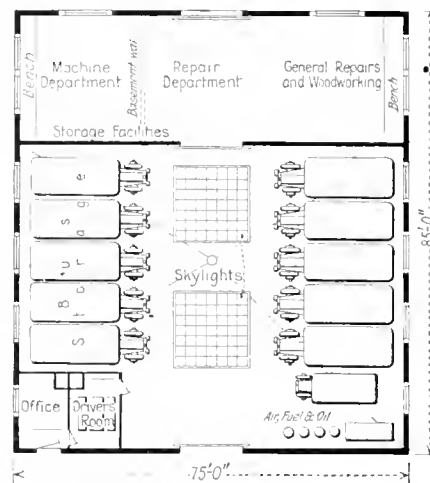
"Section 6. A public garage (defined as one housing four or more self-propelled vehicles) shall have inclosing walls of masonry, concrete or reinforced concrete. Every window exposing any building within 50 ft. shall have a standard metal frame and sash glazed with wired glass. All elevators, stairways and ramps shall be inclosed with fire-resistive material and every opening in such elevators or stairway inclosure protected by automatic fire doors.

"Exposed steel work shall be permitted in roof supports only. All floors shall be of fire-resistive construction, with an impervious surface and designed to carry safely the loads imposed. Wooden roof or floor supports shall be of mill type, or of built-up truss construction with no wooden members less than 2 x 8 in. (nominal size) in minimum dimension."

The next important thing is, how many stories shall be used? Most bus operators have adopted the one-story construction because of its advan-

tages when the land is fairly cheap. Sometimes a second story over part of the building may be used for offices or drivers' quarters, but the vehicles are all kept below stairs. Besides the question of expense, it would seem that the single-story construction is fundamentally right for bus service in general. Ordinary storage and repair work do not require the assistance of gravity.

The multi-story building is apparently a necessity in some places where the cost of the vertical construction, with all that that implies in the way of ramps and elevators, more than makes up for the additional ground that will be required



*Typical layout of maintenance facilities for ten twenty-five-passenger buses*

with one-story construction. As indicated in the previous paragraph, multi-story layouts are of particular value if the work can be carried up to the top and worked on as the parts flow down by gravity without further handling.

When elevators are installed they should be of the high-speed type, 100 to 200 ft. per minute, so that vehicles can be handled quickly. The platform should be at least 10 ft. wide and 30 ft. long, so as to permit the handling of the larger size buses. The advantages of ramps were described in BUS TRANSPORTATION, June, 1922, page 331, and these are undoubtedly useful where vehicles can be driven up all the time under their own power and it is not necessary to move disabled vehicles to any great extent. Another disadvantage is that unless up and down ramps are provided for each floor it is difficult to move vehicles against the prevailing tide of traffic, which is usually one way at certain times of the day.

On the other hand elevator construction requires the use of pits underneath, which are considered objectionable where gasoline equipment or vehicles are handled. Gasoline vapor is heavier than air and drops down to the floor, tending to fill up any depressions or low places. With the multi-story construction, however, no matter whether elevators or ramps are used, the horizontal areas are smaller, which, in itself, makes for better fire safety. There is no reason why the single-story building should not be broken up by fire-resistive walls, but the tendency is to use large open spaces, as it is cheaper and more convenient in handling vehicles.

#### LAYOUT AND GENERAL ARRANGEMENT

The average twenty-five-passenger bus is about 8 ft. wide and 25 ft. long, so that it takes up 200 sq.ft. of floor space, without allowing any room for handling or maneuvering. The simplest way to store these vehicles would be to line them up in one structure or, as is sometimes done, in a series of stalls, placed side by side; these to be separated by columns, which, with the rear wall, would form a support for the roof. Such a construction is actually used in some of the California union terminals, where passenger facilities take up part of the property and a long narrow strip of land is available. Fireproof divisions are carried between each bus stall, which is used for storage as well as for making light repairs.

In the smaller shops it is often necessary to "pile" up vehicles, without leaving any central isle or any quick method of removing them. This may use up the space perhaps, but its economy is questionable should fire or other emergency call for quick removal. In the present garage of the Peninsular Company of California about 50 per cent of outside walls are pierced by doors; the floor slopes toward these doors and they are fastened so that one man in an emergency can open them all and roll the vehicles out by hand. It may be of interest to operators who come from "Missouri" to know that this building was put up after a fire in which fifteen buses were destroyed, most of them simply because of the time required for removal.

The third form of construction, one which is being followed in many medium size shops, is illustrated in



the accompanying layout. The structure is rectangular in shape and the storage space allotted so that buses can be lined up at right angles to the longitudinal walls. With the buses thus arranged in two lines, the central aisle is wide enough for maneuvering and can also be used for extra storage.

With this layout it is a simple matter to get the advantages of inside columns and at the same time retain the maximum ease of handling the vehicles. An example of this is the fifty-bus shop, built for the United Railways of Providence, which is laid out to take twenty-five buses along each longitudinal wall leaving an aisle almost 35 ft. wide. There are two rows of columns, placed so that the buses, when backed into position, project slightly beyond the columns. The columns are set on 43-ft. centers, allowing space for five vehicles between them. Columns were used here because the cost was about \$16,000 less than if a clear-span construction had been adopted.

For smaller installations, however, there seems to be no reason why the central aisle should not be narrower; if necessary, the buses could be placed at a slight angle, to save time in handling; that is, instead of backing up against the walls at right angles, lines might be laid out on the floor so that the vehicles would be pointing toward the direction of the main entrances. The space they would take, measured from the longitudinal walls to the center aisle, would be about the same, but it would be much easier to get them in and out. This assumes, of course, that columns would not be used.

For a building 75 ft. wide, such as is shown in the layout, clear-span construction would not be so expensive. Open steel work, reinforced concrete members, or even wood lattice members, could be used to support the roof.

For a building 60 or 70 ft. wide, or more, some form of overhead lighting is usually installed. Skylights have been indicated in the layout, but monitor or sawtooth construction could be used just as well. Lighting from the roof over the central aisle has the advantage, of course, of being directly over the front of the vehicles. Sufficient light would then be provided by windows, as shown in the layout, or continuous steel sash, in the longitudinal walls, the shorter (end) walls being built up of brick and pierced only by the necessary doorways.



*Peelle Canopy Folding Door for use where wall space is valuable*

Whether a continuous sash construction is used or not, it is desirable to place wheel bumpers or guards along the floor, so as to prevent the rear end of the vehicle bumping into the wall. These guards should be laid out so that the workmen can move back and forth between the walls and vehicles. In some garages concrete guards are built on the floor to divide the storage space among the different vehicles, although where such a division is required the line painted on the floor seems simpler and more effective. This construction eliminates dangerous sharp corners with dark niches and places for dirt to collect. If columns are used, or posts, these also should have guards on the floor so as to fend off vehicles.

The typical layout shown here is designed to care for ten twenty-five-passenger buses, five along each wall. Gasoline, oil and air facilities are provided at the right-hand entrance. At the left, space is assigned for the

superintendent's office, this looking out into the main storage space, and a drivers' room with lockers and benches. The full width of the rear of the building is turned over to a repair shop, so that one complete bus can be handled inside if required. Machine tools are placed at the left-hand end, benches for handwork and testing along the wall at the left and rear, while stock and tool racks, welding equipment, portable cranes and arbor presses, not used so frequently, are along the divider wall. A skylight might be included over the repair shop, but with plenty of windows, this should not be necessary. An extra door is indicated so that in case of emergency vehicles can be taken out through the repair department.

Underneath one corner of the shop would be placed a boiler room with separate entrance from the outside. This basement could also be used for a blacksmith's forge, coal storage and such work as it is not desired to handle in the repair shop.

#### METHODS OF ARTIFICIAL LIGHTING

During daylight hours, with a good distribution of windows and overhead means of lighting, the use of artificial lights should be unnecessary. When it comes to providing the illumination required after dark, there are two methods used. The first is an attempt at fair general illumination in the storage space and a portable lighting device is depended upon for any close work. Gradually, however, with better building construction, a fairly high general illumination is provided, sufficient for ordinary inspection and to permit accurate steering. The portable



*Complete sprinkling equipment used in one of the largest service stations in New York City. (International Motors Company)*

stands or extension are used only for extremely close work. Outlets should be installed at frequent intervals, for tools as well as lamps.

With fifteen-ft. ceilings the lighting experts of the General Electric Company recommend the use of 200-watt lamps placed 20 ft. apart. This is for general illumination. The lamps should be placed high enough so as not to glare, and the reflectors should be of a type that will conceal the filaments of the lamp. Wiring should be of the best type, to satisfy the National Electrical Code. Switch and fuse boxes should be of inclosed construction. Switches should be provided on the group system, so that current will be used only when and where required.

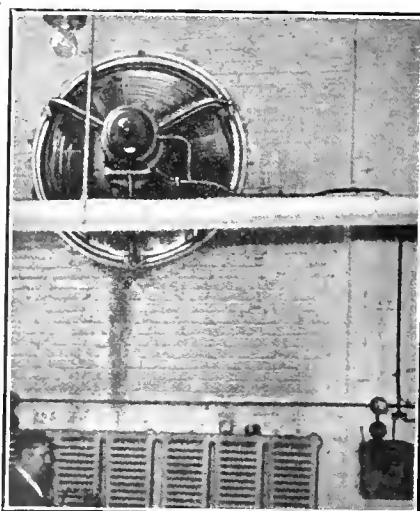
In repair shops, where more fine work is likely to be done than in a storage space, from 1 to 1½ watts per square foot of floor area is considered necessary. This would require the use of 200-watt lamps on 12-ft. centers. In the store room lights should be provided over the face of the bins and general illumination from a localized unit at the counter where parts are given out. For cleaning stands angle reflectors of the porcelain enamel type are available. These are placed on the four sides of a rectangle, thus directing the light down on the lower sides of the vehicle, which ordinarily would be dark.

Efficiency of lighting is secured also by the proper finish of ceiling and walls. An oil paint, flat or egg-shell white, is recommended for the ceiling and the upper part of the walls. This is preferred to white-wash or lime paint, since the latter are likely to flake off and get into parts exposed for repairs. For the lower part of the walls, green or another neutral color should be used to conceal fingermarks and at the same time rest the eyes.

Outside the building good lighting is needed, not only over the entrance doors but along the sidewalls; weatherproof fixtures will often come in handy instead of a long lamp line. The Washington Rapid Transit Company, in the District of Columbia, has such fixtures on the outside of its building.

#### HEATING AND VENTILATION

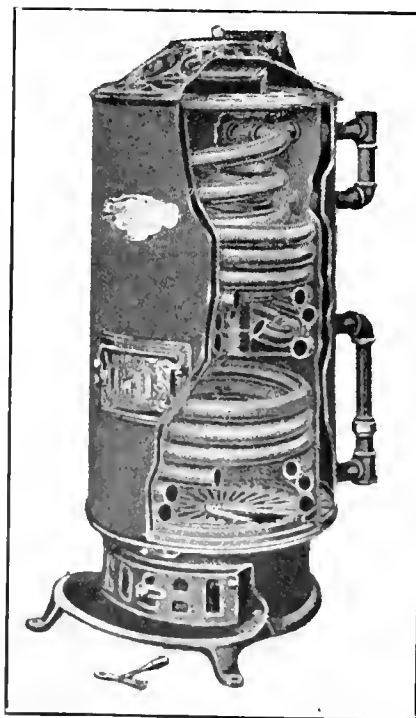
Comfort in a bus garage requires a fair amount of heat during cold weather and good ventilation at all times. A temperature of 50 deg. in the storage space and 65 deg. in office and machine shop, even in zero



*Ventilating fan to keep air moving (American Blower Company)*

weather, is advocated by a large construction firm that has had much experience in this work.

Insurance regulations and many city ordinances demand that the source of heat be placed in separate room, cut off by fire-resistive walls from the main part of the structure. A common practice, therefore, is to install the furnace in a basement underneath one corner of the building, with an entrance only from the outside. The heat is then distributed, by steam or hot water, through radiators or piping placed along the walls or suspended from the overhead trusses.



*Peter Smith hot water heater as supplied for garage service*

Ventilation, it has been said, is the most important constructional feature entering into the garage. Gasoline vapors and exhaust gases are both dangerous, and the situation may be particularly bad in winter when doors and windows are not likely to be open.

In a small shop natural ventilation may be sufficient; that is, the flow of air that occurs only because of open doors and windows. When this is the only method used, some controllable overhead ventilation should be available. This is easily secured, of course, with monitor construction, and the center aisle also helps to secure a positive air current.

Another method recommended is a series of low 1-in. pipes carried through the side walls about 5 ft. apart and terminating in the open air by turn-down elbows. With an opening overhead pure air is drawn over the floor, where it is needed to sweep away any low-lying gasoline vapors. It is said that with this system the building can be heated more quickly and to a higher temperature than with so-called natural ventilation. Radiators, mounted overhead, of course, help to keep the movement of air up through, making it lighter at the upper parts of the room. The repair shop should be higher than the storage space by from 5 to 8 in., so as to prevent the overflow of gasoline vapor from the storage room.

With larger buildings, say of 5,000 sq.ft. or more, forced ventilation is often used. A motor-driven fan may be placed in a pent house above the building, or it may be mounted in the roof trusses, or in the windows with smaller installations.

Indirect-heating methods, which at the same time provide ventilation, are coming into use for garage service. An example is the so-called hot-blast heater; this consists of a sheet steel chamber, in which steam pipes are led back and forth, and which also incloses a motor-driven fan. Cool air is drawn in at the bottom of the fan and forced through the coil, where it is heated, and then discharged through the room in a horizontal direction. This heater is made in sizes small enough to heat economically, it is said, spaces of about 50,000 cu.ft.

The importance ascribed to heating and ventilation is shown by the system the State Industrial Commission has specified for the 100-bus garage of the Wisconsin Motor Bus Lines.

This has a separate steam-heating system, in addition to an indirect system which consists of a fan in the basement, working in conjunction with a heater to force warm fresh air near the floor. There are two separate exhaust systems also. Foul air is sucked out near the ceiling by exhaust fans, and an auxiliary ventilating system works directly on the exhaust gases.

#### PLUMBING SYSTEM

Besides the ordinary comfort facilities, the next important point is the provision for floor drainage. The entire floor is usually sloped to drain into a central gutter or catch basin. With this construction the floor can be cleaned thoroughly, even though the vehicles are not washed where they ordinarily stand. The gutter in turn should drain through a catch basin into the sewer, so as to prevent dirt being washed through and blocking it up. In many cities an approved oil separator trap must be attached to the house drain, so that gasoline cannot flow into the sewer.

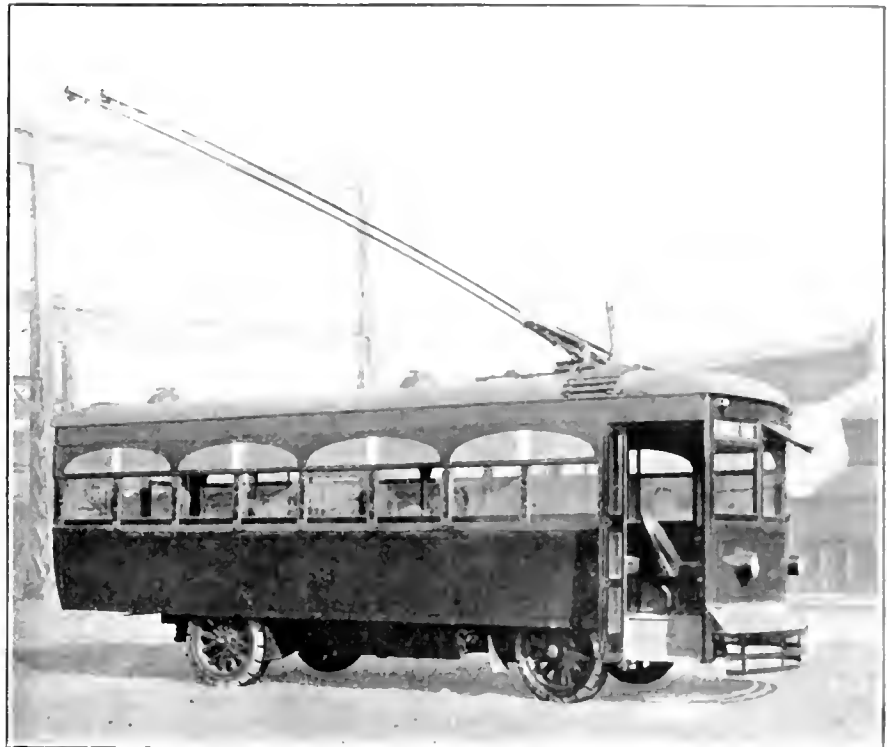
#### FIRE-FIGHTING APPARATUS

To sprinkle or not to sprinkle is something that must be settled with local conditions, fire exposure and other questions in mind. An automatic sprinkler system is required in many cities in installations where fifty or more vehicles are stored, unless roof supports are fire-protected. This equipment, of course, is expensive, and there are also objections raised, as that water will merely float burning gasoline or will spread the fire. The records seem to show, however, that sprinklers have done good work in many different garage fires. They are said to be the best available means to offset dangers, which even a careful use of gasoline present. Even though the sprinklers are used, it is necessary to install portable (chemical) fire extinguishers, sand pails and fireproof receptacles where dirt and oily rags can be stored.

So far this article has considered only the building and its closely related parts, such as heating, lighting and ventilating apparatus. There still remain to be taken up facilities for storing fuel and lubricants; devices for handling the vehicles, such as cranes and hoists; inspecting and adjusting instruments; machine tools and devices—all important in the maintenance shop, but which, for lack of space, must be considered in a later article.

## Trolley Bus Operation Inaugurated at Petersburg

This First Installation by an Important Railway Company in Virginia Is Intended to Demonstrate the Value of Railless Traction as Supplementary to Electric Railways



*The Petersburg bus collects current by means of two trolley poles.*

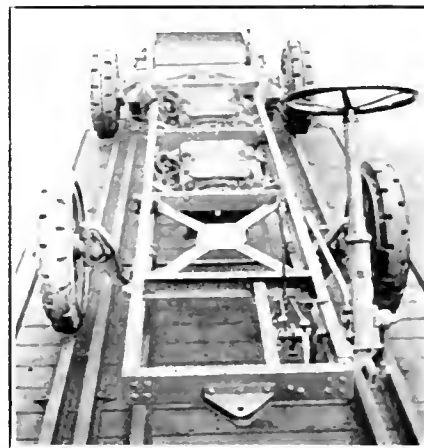
SINCE June 19 the Virginia Railway & Power Company is operating two railless cars, or trolley buses, in Petersburg. The new service supplements that of the car lines, leading from the end of the Walnut Hill car line, through a newly developed residence section in

the southern part of the city, to the terminal at Lee Park. The route distance from the end of the car line to the terminal is 0.8 mile. The route lies through streets newly surfaced with gravel and oil, and conditions generally are quite favorable to the entirely successful operation of the vehicles.

The schedule of operation of the buses provides for a fifteen-minute headway.

As it was necessary to store the buses in the carhouse located on Chatfield Street, a negative return wire was strung on the outside of each positive trolley wire on the street between the carhouse and the beginning of the bus route.

The buses were built by the J. G. Brill Company, in accordance with specifications revised in May, 1923. They are, however, of standard construction, weigh 12,000 lb., seat thirty passengers, and are 23 ft. 2 in. long over the body, 7 ft. 6 in. wide over the posts. With the body unloaded the vehicles stand 9 ft. 6 in.



*Chassis of new trolley buses. Electric motors placed in tandem can be seen in background.*

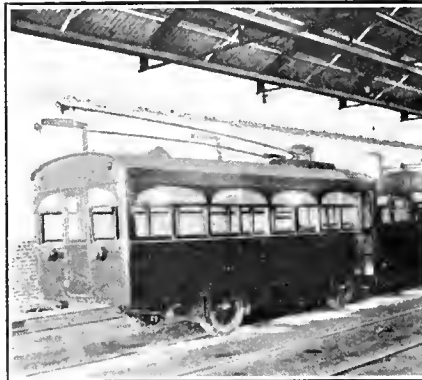


*The seating arrangement gives a good combination of seating and standing space*

in. high from ground to trolley board.  
Other dimensions are as follows:

Wheelbase .....	137 in.
Overall length of frame.....	244 in.
Width of frame, at front.....	33 in.
Width of frame, at rear.....	39 in.
Height from ground to top of chassis, under full load .....	23½ in.
Gage, front .....	61½ in.
Gage, rear .....	70 in.
Height from ground to underside of sill, unloaded .....	2 ft. 1½ in.
Height from ground to top of floor, unloaded .....	2 ft. 4¼ in.
Height from underside of sill to top of roof .....	7 ft. 1½ in.
Height from top of floor to top of roof, 6 ft. 9¾ in.	
Height from top of floor to roof carlines, 6 ft. 7½ in.	
Height from ground to top of roof boards, unloaded .....	9 ft. 3 in.
Height from ground to top of floor, loaded, 2 ft. 3½ in.	
Center to center of side posts.....	2 ft. 5 in.
Length of transverse seats.....	2 ft. 8½ in.
Width of aisle .....	21½ in.

A transverse seat is placed across the rear of the body, the center section being arranged so that it can be removed to give access to the emergency door. On each side of the body, directly adjacent to the transverse seat at the rear end, is a longitudinal seat accommodating three persons.



*A carhouse view, of emergency exit door, trolley catchers and tail-lights*

From these longitudinal seats forward on each side of the body there are three transverse seats 32½ in. long, to accommodate two persons.

On the left-hand side of the body at the front, directly in back of the driver, there is a longitudinal seat for three persons; and on the right-hand side at the front is a longi-

tudinal seat for four persons. This arrangement provides a number of cross-seats for patrons who prefer them, while giving a reasonable standing space. Stanchions are provided near all of the longitudinal seats.

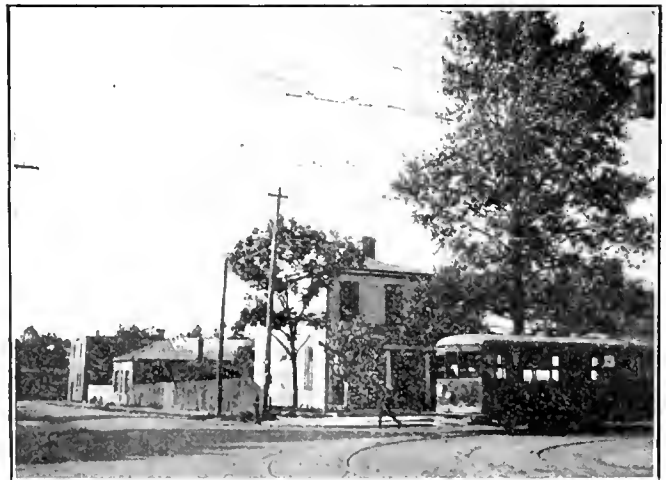
The vehicle is driven by two GE-264 motors of 25 hp. capacity at 550 volts, arranged in tandem to drive the rear axle. These have capacity to operate the car at 22 to 25 m.p.h., with 1½ m.p.h.p.s. acceleration and retardation. This corresponds to a scheduled speed of 9 to 10 m.p.h., with eight stops of fifteen seconds each per mile.

Double pole collectors, with Ohio Brass Company's swivel trolleys are used. The same company's standard overhead materials are used in supporting and insulating the trolley wires.

While only two trolley buses are being operated in Petersburg, the installation is more significant than this fact would indicate. The Vir-



*A typical view on the new route over which the trolley buses operate*



*Where the car track is followed, a supplementary overhead wire is installed*

ginia Railway & Power Company believes in this type of vehicle for service supplementary to that of the car line. The company operates the railways in Richmond, Norfolk, Portsmouth and Petersburg. If the success of the installation in Petersburg warrants, as it is fully expected to do, trolley buses will be substituted for some rail lines where traffic is too light to support the latter and will be used for extensions of lines.

The company has not the sanction of the cities other than Petersburg for such operation, so nothing can be done elsewhere for the present. It is hoped, however, that success in Petersburg will be such as to convince the city authorities in the other municipalities.

It is estimated that the operating expenses of the trolley buses in Petersburg will be not more than 17 cents per bus-mile.

## Steam Motive-Power Tried Out for Bus Service



*Driver's position and steering post of trolley bus*

**B**ELIEVING that the ideal motor bus should have the following characteristics, freedom from vibration at all speeds, smooth and rapid acceleration and proper spring suspension, in addition to economical operation and ease of control, Page, Beck & White, Inc., of Chicago, have designed and built an experimental steam-driven bus, in which it has sought to embody these features. From the passengers' standpoint the steam engine is believed desirable because it is quiet, free from vibration through its range of speed, and develops a uniform torque, which results in smooth and rapid acceleration. Though theoretically not as efficient, steam power uses low-cost fuel and will, it is said, deliver a mile at less cost for fuel and lubricating oil. For this vehicle, the fuel cost is given as 2.2 cents per mile, while

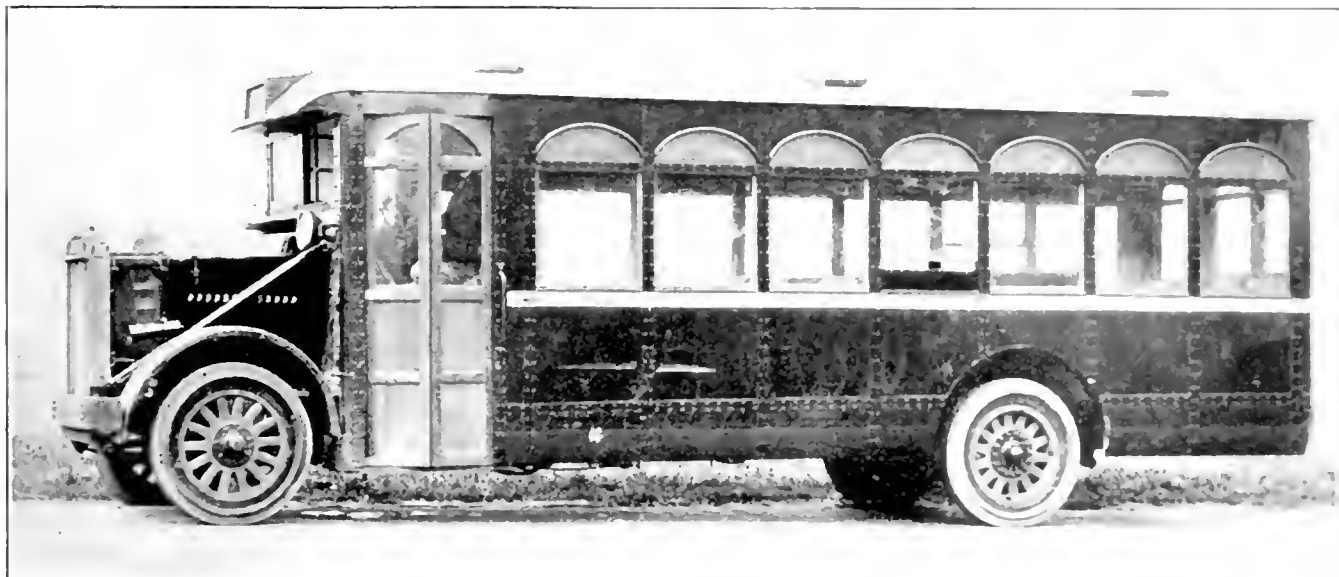
the oil cost is not over 75 cents per 1,000 miles.

The accompanying photographs give an idea of the size and construction of the new bus, which has been given several months of road work and special tests.

As the efficiency of steam-driven equipment depends primarily on the efficiency of the boiler, the work of the engineers centered upon this detail, resulting in the Winslow boiler, shown in the accompanying photograph. This is of the sectional construction water-tube type. Each section is a complete boiler in itself and can be removed and replaced without totally dismantling the boiler. Water stands about half way up the section when cold, but upon application of heat its level rises in the one end and drops in the other end of the section. As the heat application is continued steam is generated and the

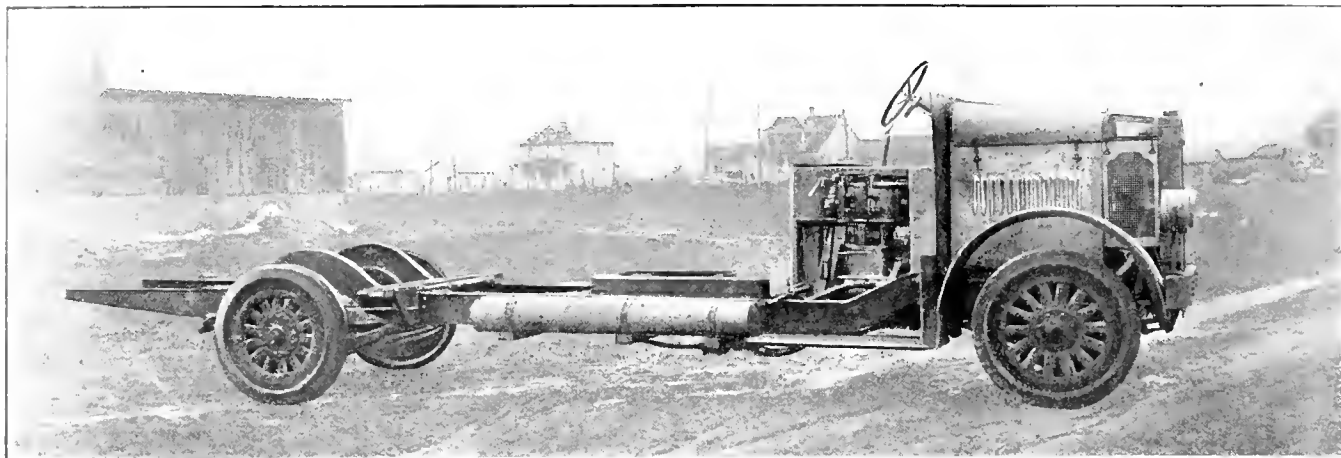
water flows more rapidly. There is then a scouring action produced through the tubes, which helps to eliminate scale. Sediment, which will precipitate in any steam generator, is swept out of the path of circulation and settles into the mud collector.

The control system is simple in construction and has been found free from trouble. An electric switch operated by a diaphragm communicating on one side with the steam space of the boiler serves as the burner control. Closing and opening the circuit starts and stops the electrically driven blower; this delivers a fixed amount of air to the burner and also drives the fuel pump. The pilot light, which is necessary in an on-and-off burner of this type, operates continuously. Fuel flows to the nozzle of the pilot



*Steam-driven bus, fitted with 29-passenger body as developed by Chicago engineers*





*Chassis of steam bus, showing engine mounted side of driver*

burner by gravity and is there atomized by a jet of steam at 5 lb. per square inch pressure. This light is larger than has been customary in automotive steam plants, it being the intention of the designers to provide a strong, tenacious flame that would never be extinguished by a blast from the main burner. The water level in the boiler is maintained by a thermostatic tube control of the same design as has been used in stationary plant practice and on steam vehicles for many years. Water is supplied to the boiler by a triplex feed pump, designed for high pressures, and connected to the engine crankshaft through 1:4 ratio gear.

A conventional design of compound engine ( $3\frac{1}{2} \times 7 \times 5$  in.), having a starting device controlled by a floor-board foot button, is mounted back of the boiler and dash. Depressing this control button admits live steam to the low-pressure cylinder, giving the engine additional power for an emergency load. Main engine

valves are of the balanced piston type, without rings, and are made of chilled cast iron.

Steam admission may be changed from 85 per cent to 25 per cent of stroke, the latter being the point at which the cutoff is carried for normal loads. Joy valve gear is employed. A plain jaw clutch disengages the engine for idling or for pumping as the occasion may require. It is not used in normal operation. The condenser is a honey-comb-type radiator with a frontal area of  $8\frac{1}{2}$  sq.ft., made by the United States Cartridge Company.

Draft through the condenser is provided by a rotary outlet, shrouded, suction fan, of the American Blower Company's make. With this assembly of condenser and fan condensation is so thorough that the vehicle can travel from 120 to 150 miles on one filling of the 45-gal. water tank.

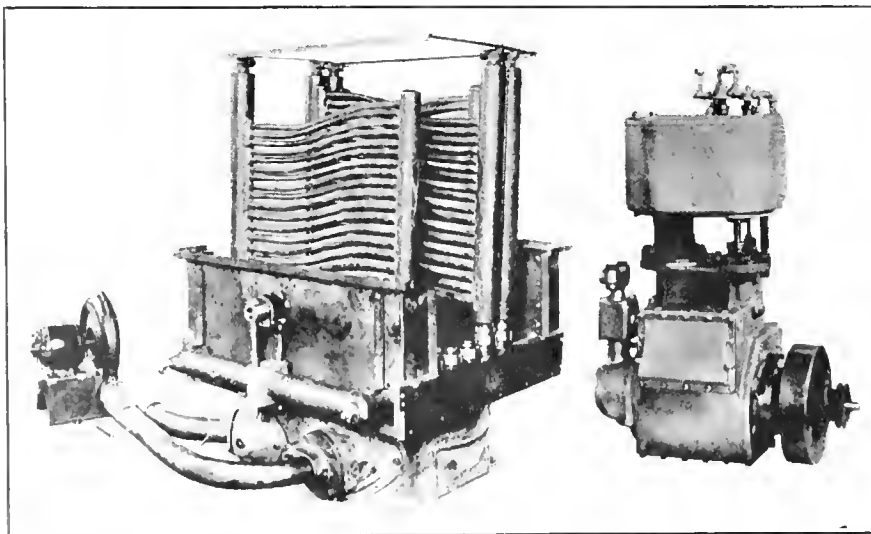
The propelling mechanism is similar to that employed on any automotive vehicle, the drive being through universals, to a full floating rear axle built by the Wisconsin Parts Company. The rear springs are mounted rigidly to the rear axle housing, without radius rods or torque arms. Both front and rear springs are compound, semi-elliptic, supplementary leaves being brought into action with increased load.

An unusual feature of the bus, as is shown in the front view, is the mounting of the steering gear, which is set with as much rake as is usually found in pleasure cars. To accomplish this it has been necessary to mount the steering-gear case well to the front and on the outside of the frame. The trunnion shaft extends entirely across the frame, and the drop arm and drag link are placed on the opposite side, which makes for additional safety.

The bus body will accommodate twenty-nine passengers and a driver, with seats spaced  $29\frac{1}{2}$  in. center to center. The driver's position is high and well to one side, in order that he may gage his clearance when passing vehicles.

### Motorbus in China

SEVERAL members of the local Sengtry of Szechow, Arhui Province, China, are reported to be planning the installation of a motor bus service between Szechow and Tsingyangchen. The plan is proving very popular and funds are being raised to capitalize the enterprise. As the present mud road between Szechow and Tsingyangchen is in good condition, the promoters have decided to order a few buses to make tentative trips on it. Later a macadamized road will be built. Bus service will probably begin in the autumn.



*Assembly of Winslow water tube boiler, on left. Engine unit has 3-in. and 7-in. cylinders, and 5-in. stroke*



# Place of the Bus in City Transportation

By J. A. Ritchie

President Chicago Motor Coach Company, Chicago, Ill.

**M**OTOR BUSES, and particularly double deckers, should be used for surface transportation in the downtown or Loop District of Chicago. Mr. Ritchie, now of Chicago but recently of New York, urges this in a report made to the city abstracted below. To relieve traffic congestion, to save time for the passengers, he would have the trolleys drop underground while in the Loop. In the outlying parts of the city, which is growing rapidly, he predicts a wide field for bus service. The reports refer to Chicago conditions, of course, but many of the principles laid down, as to growth of population, function of transportation agencies, relief of traffic congestion, would apply to many of our larger cities.

**T**O FIX the place of the motor bus in a comprehensive plan for transportation in Chicago, it is first necessary to outline broadly the requirements, and also the general principles that are to be followed.

The location of the business center on the lake front so restricts the direction of growth, that to accommodate the same number of people per square mile as in a city that can grow in all directions, an area is needed that extends a distance at least 40 per cent from the center. This means that the average ride into the center of Chicago is nearly 50 per cent longer than in a city that can grow in all directions.

The territory can be considered under five divisions, namely, a central business district; an inner residential district extending 5 miles from the center and including a large part of the light manufacturing; an outer residential district extending from 5 to 10 miles from the center; South Chicago, largely constituted of important industrial centers with surrounding residential districts, and a suburban territory that extends from 10 to 30 miles from the center, that includes several large centers of heavy industry.

The central business district is about 1.25 square miles in area. Each person in Chicago makes practically one city journey a day—about 60 per cent of which are in and out of this congested business district. The Loop District movement is therefore about 1,000,000 passengers each way per day.

Outside of the central business district, the larger occupational centers are the manufacturing districts immediately west of the Loop,

the west and northwest parts of the city, the stockyards, and South Chicago. Except for the industrial centers of South Chicago, manufacturing is largely concentrated in the inner 5-mile belt, where, as shown in one of the accompanying tables, nearly 50 per cent of the city's population resides. This percentage is probably as great as it ever will be; larger apartment houses will provide greater accommodations than at present, but the rapid growth in this section of industrial and business establishments will force new population in the future to settle beyond the 5-mile circle. This is the so-called outer belt, which is from 5 to 10 miles from the center, the territory of which is now largely occupied by residences with retail shopping centers and scattering industries.

The 1916 report of the Chicago Traction and Subway Commission estimated that a population of 5,000,000 could be comfortably accommodated within the present city limits and suburbs. This is 2,000,000 more than the present population, and if this new population should settle within the 5 to 10-mile district then population density of the district would be about 36,000 per square mile, which is

comparable with 1920 densities of 4 miles from the center.

The suburban territory, extending beyond the 10-mile circle and extending out about 30 miles from the center, requires at its center an average ride of about one hour by the fastest train. This district, which now has a population of 900,000, or an average density of 700 per square mile, must accommodate a much larger population. Its capacity to do so will depend upon the efficiency of its transportation facilities to the important business and industrial objectives in the city.

## PRINCIPAL TRANSPORTATION AGENCIES

It is generally conceded that within the inner residential district most of the traffic is most efficiently handled by surface facilities.

From the outer residential district to and from the business center, the bulk of the through movement of people conveniently located is most expeditiously handled by high-speed subway or elevated lines with lateral surface feeders.

In the suburban territory beyond the 10-mile limit, the principal

Mileage of Chicago Surface Track per Square Mile Compared With Population per Mile of Track

Mileage per Square Mile	Population per Mile of Track	Ratio Mileage to Population
0.1	100	0.001
1.2	100	0.012
2.3	100	0.023
3.4	100	0.034
4.5	100	0.045
5.6	100	0.056
6.7	100	0.067
7.8	100	0.078
8.9	100	0.089
9.0	100	0.090

Average = 0.089

Population and Density by Mile Zones in 1920

Mile Zone from Center	Population 1920	Per Cent of Total City Population	Population per Square Mile	Density per Square Mile
0-1	20,000	0.8	20,000	20,000
1-2	181,896	7.6	90,948	90,948
2-3	325,632	13.4	108,544	108,544
3-4	384,568	15.4	96,142	96,142
4-5	406,192	16.2	81,238	81,238
5-6	433,328	17.6	72,221	72,221
6-7	359,552	14.4	51,363	51,363
7-8	295,952	11.8	37,244	37,244
8-9	180,000	7.2	20,000	20,000
9-10	83,224	3.2	8,322	8,322
Total or average	2,672,544	100.0	267,254	267,254

(Estimated by 1916 Chicago Traction Commission)

agencies are, in order of importance, steam railroad suburban service, and surface feeders connecting with city high-speed lines.

For all short-haul local traffic in a radial direction and for practically all traffic moving laterally, surface transportation is best adapted economically.

#### PROBLEM IN CENTRAL BUSINESS DISTRICT

The central business district has twenty streets leading outside, of which fifteen are occupied by surface tracks, and there are three surface railway tunnels, making a total of eighteen pairs of surface railway tracks. There are also four elevated lines having a total of eleven tracks, and five main-steam railroad stations with two stations used for suburban traffic. These rail facilities are now taxed practically to capacity and the all-important problem is to make such a comprehensive plan of transportation as will accommodate at least three times the present population and permit its natural and healthy growth and distribution.

Looking into the future, the number of passengers entering the central business district will probably not increase in proportion to the population of the city, principally because the district will become enlarged in area and because outlying centers, particularly industrial, will increase in importance. In any event, however, due to the increasing average and maximum height of office buildings, the business population of the area covered by the present central business districts will be greater in the future. While the Loop terminal of the elevated railways is now loaded to capacity, it was made clear in the 1916 report of the Chicago Traction and Subway Commission that adequate subway and elevated terminal facilities could be provided in the present Loop district for a far greater passenger movement than at present. If the principles laid down in that report be followed, there is no doubt that the subway and elevated system can readily be made adequate to handle the traffic within its natural zone of service for as large a population as can reasonably be expected in Chicago.

The problem of the surface railways is not so simple. In the outer sections of the city, the field of surface railways is limited by the population and traffic becoming too

light to support them. Below a certain number of passengers per mile of route per year, the motor bus has an economic advantage over the surface railway. Improvements in buses in the future will undoubtedly operate to enlarge their field and reduce that of electric railways outside the more densely populated areas.

In the other principal field of the surface railway, that is, the carriage of passengers between the business center and the densely populated zone lying within 3 or 4 miles thereof, the combination of low operating expense and high density enables the electric railway to operate on an economical basis. This movement, however, has already practically reached the limit of capacity of the surface lines. It is true that the population and hence the traffic within the 5-mile radius is already dense, and is not likely to increase to any marked degree, but as the elevated lines become more largely occupied by passengers from outside this limit, there will naturally be a drift of traffic to the surface lines, provided their running time does not become too slow within the congested business district.

At present the surface lines outside the central business district make an unusually high rate of speed as compared with that in other large cities. From the 4-mile circle to the limits of the business district the average speed is about 10 m.p.h. Within the business district, however, this excellent speed is neutralized by a slow movement for over one-half mile in each direction and as the limits of the central business district expand, this condition will become worse due to the greater distance to be traveled in the congestion.

#### HOW THE CONDITIONS CAN BE REMEDIED

To preserve the usefulness of the surface lines to the central business district the only solution is a system of subways to accommodate the greater part of the surface lines entering the business district. An adequate system of surface car subways of this nature was recommended in the 1916 report of the Chicago Traction and Subway Commission.

Such a subway system would reduce the running time of cars from the 4-mile circle by 15 per cent, from the 2-mile circle by 30 per cent and allow twice as many surface cars to enter the Loop system during the

rush hours. The subway would effect a material saving in the cost of operation by reason of the higher speed and open track construction, a saving in power, accidents and in snow-removal expense, which taken with the increased schedule efficiency should largely offset the fixed charges on the cost.

It is now difficult to get about in the business district and this difficulty will increase as the congestion increases and the business district enlarges. Practically no one uses the street cars for short rides because the routing is not and cannot be designed to accommodate such travel. The large majority of all movements in this district, therefore, are made by walking or by taxicab.

A considerable relief in street congestion and a great convenience can be afforded by a few carefully laid out lines of buses with well-marked loading points, and with routes thoroughly advertised and indicated on the buses themselves. The bus is especially adapted to this service because not being dependent upon tracks, it can be easily routed to reach a larger number of traffic points and can use streets not adapted to street cars.

#### RECOMMENDATIONS FOR USE OF BUSES

Within the city of Chicago there are now 80 miles of boulevards. The primary objects of which are to provide direct thoroughfares in which traffic can flow in large volume with a minimum of interruptions and to create and preserve show places and breathing spaces.

The large population which will naturally locate along these boulevards will require convenient, adequate, attractive and comfortable public service transportation facilities such as can be furnished only by motor buses.

There are eight large parks within the city limits frequented by practically all of the population of the city as well as by visitors. The so-called organized attendance is from 25,000,000 to 30,000,000 per year. This is recorded attendance for specific purposes and does not include spectators or casual visitors. The total attendance at the parks requiring transportation, must be well over 50,000,000 per year, and this number will increase at least in proportion to the increase in population if proper facilities are provided.

Due to the investment required in track and roadway for rail lines,

there are many streets in the suburbs and less densely populated sections of the city in which rail lines cannot be constructed and operated within economic limits. One of the prime functions of the motor bus is to supply service on such streets.

The mileage of surface railway tracks, together with the density of population per mile of track in the various mile zones, is shown in the accompanying table. In proportion to population the trackage decreases up to 3 miles from the center, remains about uniform to 6 miles, and then increases until in the 9 to 10-

large industrial or traffic points, churches, theaters, conventions, or other points of assembly, and recreation centers. An important point of this character is the Municipal Pier. At times of conventions special bus lines could be operated between the pier and railroad stations, hotels and other objective points. It is not feasible or desirable to lay a system of tracks as would permit surface cars to provide such flexible service without transfer, while the motor bus is ideally fitted to operate such routes.

Boulevards and park driveways have been created for pleasure

north side bus lines were pleasure riders, or were attracted to the bus lines on regular business or shopping journeys during the warmer months. The accommodations for pleasure travel on these lines were inadequate so that probably 25 per cent of the total travel on the city buses is pleasure riding. This is borne out by analyses of the traffic of the Fifth Avenue Coach Company, New York.

With the surface railway in the Loop District used almost entirely as terminals, little or no thought can be given to the accommodation of local traffic. There are few instances of



*Traffic congestion is serious in the Loop District. Conditions on Saturday, May 12, 1923, at 1:40 p.m.—State and Madison Streets*

mile zone there is more than twice the track mileage than in the 5 to 6-mile zone, or, conversely, there is less than half the population per mile of track in the 9 to 10-mile zone. In the area between the 8 and 10-mile circles, constituting 40 per cent of the total area within the 10-mile circle, there is on the average the equivalent of but one pair of tracks each way across each square mile. As fast as this territory develops, additional surface transportation must be provided and there will be a wide field for motor bus service.

There are many cases which can be determined by careful studies where, to obtain the best economy and convenience, routes should be altered for different times of the day, different days of the week, and seasons of the year. This is principally for the purpose of serving

riding. Surface lines were formerly used to some extent for this class of riding, but at present there is probably little, if any, on either surface or elevated lines. Only about one family in five in Chicago owns an automobile, so that four-fifths of the population have no regular means of pleasure riding other than that afforded by motor buses. That there is a large demand for pleasure riding is evident from their use wherever motor buses catering to such business are operated.

The number of passengers carried by the Chicago Motor Bus Company by months in the year 1922, and the excess of travel in the spring, summer and fall months over the number carried in the month of March is shown in the accompanying table.

It would appear then that about 24 per cent of the passengers on the

direct railway routes between traffic points in the Loop District, and these are little used because not generally known to the public; because the cars are overcrowded during about half the business day; because the movement is slow; and because of the inconvenience in getting on and off in the middle of the

*Passengers Carried in 1922—North Side Bus Lines*

Month	North Side	Excess over March	Percentage Excess
January	413,662		
February	349,189		
March	311,493		
April	680,084	368,591	118
May	754,000	442,507	142
June	841,220	529,727	170
July	941,573	629,080	202
August	887,735	576,242	185
September	751,615	440,122	141
October	642,766	331,273	106
November	508,086		
December	492,027		
Total	7,775,991	871,126	23.9

street. There is undoubtedly a large volume of such local movements which would patronize a transportation system properly planned and advertised, and as the business district enlarges such facilities will become an absolute necessity. The motor bus is far superior to all other means of transportation for this purpose, and ought to operate to reduce the congestion by accommodating people who would otherwise use taxicabs or walk.

#### HANDLING RUSH-HOUR TRAFFIC

The present trackage leading in and out of the central congested district is already overtaxed during the rush hours, and this condition is

The greatest service is obtained from a street when the greatest volume of traffic is put through it. In the Loop District, except on certain

	Width of Road—way, Ft.	Inbound		Outbound	
		Period	No.	Period	No.
Jackson.. Madison	37	5:10-5:20	128	5:20-5:30	184
	37½	4:40-4:50		3:30-3:40	
		Vehicles	47		58
		Cars	19		10
Clark...	2-18	Total	66	4:40-4:50	68
		Vehicles	45		61
		Cars	7		9
		Total	52		70

streets, the principal consideration is passenger traffic.

Vehicular traffic within the Loop reaches a peak in one direction at about 10 o'clock in the forenoon, then

are throttled in so far as they are dependent upon it for their terminal facilities.

Owing to the vehicular congestion and in considerable part to the interference of the surface cars with each other, the average speed maintained by surface cars in the Loop area is less than 5 m.p.h. during the rush hours. This results in an average round-trip running time of about fifteen minutes on each trip. If this period necessary to make terminal deliveries in the central business district could be reduced by one third, the outlying area in which the surface railway is best adapted to service would be extended about 1 mile. If this area is considered as extending about 4 or 5 miles from the center, then the increase in effective area of the surface lines for Loop District traffic would be about 25 per cent.

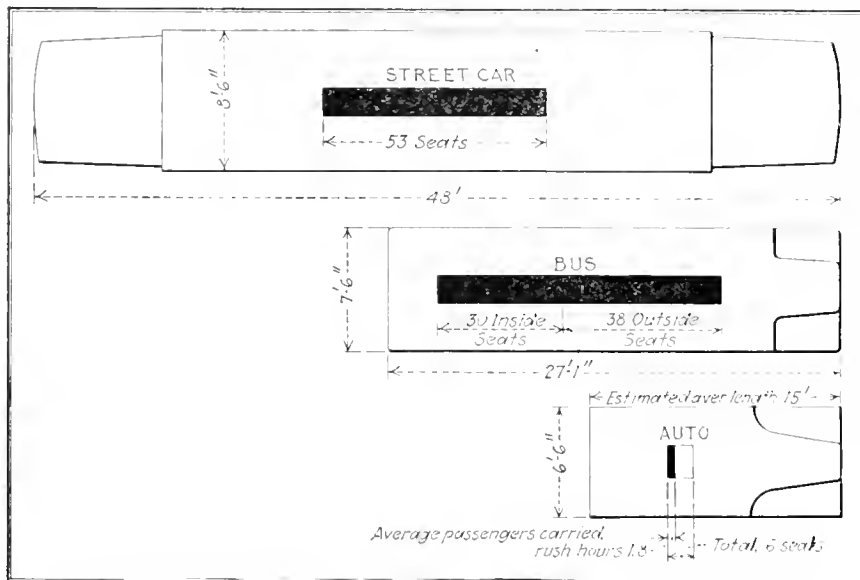
#### RELIEVING CONGESTION AND INCREASING STREET CAPACITY

The principal devices by which congestion can be relieved and the street capacity in the Loop developed to its fullest extent are: terminal subways for surface cars; use of motor buses; establishment and enforcement of approved traffic regulations; and street improvements, such as opening of belt streets to divert traffic not intended for the Loop and widening of certain streets to take additional traffic lanes.

#### TERMINAL SUBWAYS FOR SURFACE CARS

The advantages of a terminal subway for surface cars have been touched upon. Subways of this kind have been in use in Boston and Philadelphia for many years, and plans for similar subways have been developed in other cities, particularly Cleveland and Cincinnati.

As has already been pointed out, the two principal fields of service of the surface railways are, for Loop-bound traffic within the 5-mile circle, and for local traffic outside the 5-mile circle. In the first field they have admittedly reached their limit of capacity except possibly during the non-rush hours, and in the second their usefulness is greatly circumscribed by the efficiency of the motor bus. It is clear, therefore, that the future usefulness of the surface railways to the community as well as the best interests of their owners, depend upon a radical improvement in the present Loop terminal facilities.



Comparison of street-space actually occupied by a motor bus, a surface car and an automobile

likely to continue even though a reasonable program of subway construction is adopted. It is desirable, therefore, to make use to the fullest extent of all streets leading in and out of this district. The motor bus is more economical in the use of street surface than any other conveyance, and it is fully twenty times as efficient in this respect as privately owned automobiles.

The curtailment of vehicle traffic by street cars is shown by conditions at the bridges on Jackson Boulevard, and on Madison and Clark streets. During the ten-minute period when the heaviest traffic was recently observed, the number of vehicles passing are shown in the table.

The indications on the face of these figures are that a 37-ft. street will accommodate three times as much vehicular traffic as one occupied by street cars.

decreases to a small extent and reaches a peak in the other direction at about 5 o'clock in the afternoon. The peak of street railway service comes about an hour earlier in the morning and a half-hour later in the afternoon. The traffic is somewhat greater during and before the winter holiday season than at other times of the year.

There are few streets in the Loop not occupied by surface railways. At the rush hours there are from three to four cars in every block; that is, about two in each direction. At nearly every corner the cars make turning movements which block the vehicular movements in several directions. It is generally admitted that the street railway system under present conditions has absolutely reached its limit of capacity of service in the Loop District and therefore the capacity of all entering lines

Excepting trucks which do not enter into the Loop traffic problem in the rush hours, the ultimate object in each street should be to get the greatest number of people through the street. That is, to make the streets serve as many people as possible.

The privately-owned automobile occupies about 16 sq.ft. per passenger with every seat filled and without allowance for clearances. In observations taken during rush hours in Chicago, the average number of people per automobile was 1.81 including the driver. On this basis, therefore, an average automobile requires about 54 sq.ft. per passenger carried during the rush hours without clearance allowance. On the other hand, a motor bus of the double-deck type occupies only about twice the area and seats sixty-eight people, requiring 3 sq.ft. per seated passenger. Based upon observations on the north side lines, this bus will carry out of the Loop District an average of sixty passengers, requiring only 3.4 ft. per passenger as compared with 54 sq.ft. for each passenger carried by automobile. The bus therefore is sixteen times as effective in the use of the street. This measure of effectiveness would be somewhat increased were necessary clearances considered.

The effect of the use of motor buses upon the efficiency of a street is demonstrated by the chart shown here. If but 15 per cent of the vehicular movement capacity of a street be utilized for motor buses, the passenger carrying capacity of the street would be 4.39 times as great as if the street were restricted to automobiles. It also shows the capacity that would be added by each 1 per cent of bus occupancy of the street up to 15 per cent. Thus for a comparatively trivial curtailment of use by private automobiles an enormous increase in efficiency is obtained. A recent survey of Michigan Avenue shows that when 1 per cent of its vehicular traffic consists of motor buses, the carrying capacity is increased by 2.1 per cent. This increased carrying capacity multiplies as more motor buses are used. If only 15 per cent of all the vehicles on Michigan Avenue were motor buses, the carrying capacity would be increased 354 per cent.

The area occupied and the seating capacity of street cars, motor buses and automobiles are also compared. For each seated passenger 7.7 sq.ft.

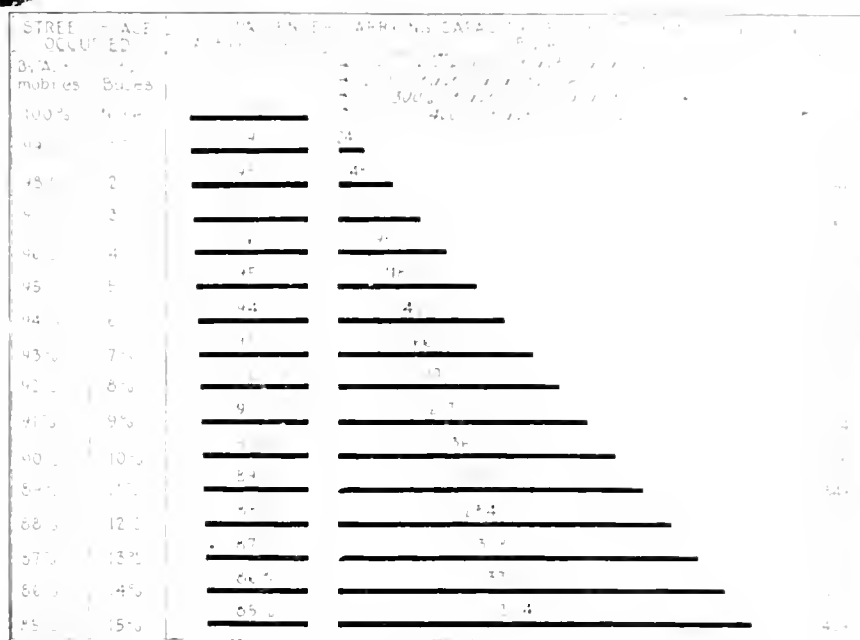
of area is required by street cars without clearance allowance, as compared to 3 sq.ft. for buses. The latter, therefore, have a direct effect in relieving congestion.

#### MOTOR BUS VS. SURFACE RAILWAY

From the financial point of view, motor bus operation requires an investment per dollar of gross revenue of but \$1.25 as compared to about \$4 on a surface electric railway line. It is easier to raise money on this basis and the amount placed at the hazard of the business is less. The major part of any such investment is in the buses themselves, which can be sold and used in another place, while the garage and its equipment is suitable for public use.

to special traffic requirements, routes can be altered without dislocation of service. Snow removal is also easier and no troubles are encountered from frozen switches or sleet on the wire. Lastly, motor buses have a considerable "by-product" income from excursions or private hires.

Advantages from bus operations from the standpoint of passengers are the elimination of delays on account of vehicles on the track, broken down car ahead, slow motorman, fires, power house or wire troubles, or waiting on sidings on large track lines. A higher average speed can be maintained because of free movement in congested districts and limited stop service. The bus also offers more pleasant and safer riding because of the lack of noise, curb



*Motor buses are a factor in increasing the efficient use of a street*

The investment in an operating bus company is also largely adjustable, and changes can readily be made to enhance the convenience or earnings. Then with buses no long construction period is required; they can be installed quickly, once operating rights have been obtained, thereby preventing an accumulation of considerable interest during construction.

Motor buses have already demonstrated their practicability, and are bound to improve in scope, efficiency and earning power. They also have advantages in operation. More speed can generally be maintained because of the fact that the buses are not restricted to fixed rails, and limited stop service can be run on many streets. In emergency cases or due

loading of passengers, sightseeing from the top deck, and smoother riding.

From the public standpoint, motor bus operation does not require overhead wires, poles, rails or switches in the street and further, it is unnecessary to tear up the paving for construction and repairs. The noise of crossing switches is eliminated. Streets can be used more efficiently, particularly in the congested district because the buses stop at the curb, move at the same speed as other traffic and require much less space per seated passenger than street cars. The buses provide a means for "seeing Chicago beautiful" and also recreation privileges for visitors and for the people of the city as well.

# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, August, 1923

## *The Nation Mourns*

**T**HE news that President Harding has passed on will bring a feeling of deep and genuine sorrow to every citizen. His work, his life story, his human qualities, have all been referred to fully in the newspapers and need not be dwelt on here.

Only last month BUS TRANSPORTATION called attention to the keen grasp of transportation matters which was displayed on June 22 in the President's Kansas City speech. For years Mr. Harding had been a sympathetic student of the subject, and had spoken many times before transportation associations.

In this time of national bereavement, all transportation men will join most sincerely in tribute to the memory of Warren Gamaliel Harding.

—[ EDITORIAL ]—

## *Get Ready Now for Winter*

**S**NOW FIGHTING—the methods, equipment and organization that have been successfully applied by operators under the most severe conditions—are discussed in several articles in this issue. They are published now so that bus operators can study them carefully and can appropriate ideas in anticipation of next winter's operations.

Now is the time for the bus operator to find out just how much help in fighting snow can be expected from state, county and local authorities. It is also the time for him to show merchants' associations, motor clubs, large mills and other industrial enterprises that they should help in keeping the roads open; to discuss co-operative schemes with other operators perhaps; and for the operator who works a given route alone to get equipment ready and to decide just how he will use it. In handling snow, is the old method of breaking through by horse teams or of hiring men with shovels to be followed, or is resort to be had to the cheaper and much more rapid motor equipment?

During the next few months the rolling stock should be put in shape to meet the severe demands encountered in winter operation. Doors and win-

dows should be made tight and put in good working order. As for the heating system, the question should be decided now whether a new one is to be installed or the old one tightened up so that the exhaust gases will give up the heat, and nothing else, to the inside of the bus body.

There is a good deal more to winter operation than just keeping faith by trying to run on schedule no matter what happens. There's a lot of business that operators can get during the winter from people who run their own cars when they have time, during the summer months. In order to get that business, however, the roads must be opened and riding made fairly comfortable.

To repeat: Now is the time to get ready. Plan to have equipment in shape. Get after the authorities and after their bosses, the public, if necessary. Make some sensible arrangements in advance for meeting the snow problem and be sure that the equipment used has sufficient punch so buses can keep running, no matter how bad the winter.

—[ EDITORIAL ]—

## *Buses Not for Mass Transportation*

**R**ELIEF of vehicular congestion in Chicago's Loop district is just now receiving much attention. Under present conditions speed of travel is not more than five miles per hour during rush hours.

J. A. Ritchie, in a report to the city, an abstract of which appears in this issue, advocates putting the street cars underground in the loop district to relieve the surface congestion. Then, to handle local surface traffic within the cleared district, he suggests a few well located and advertised bus lines.

From an economic standpoint it is hard to see that this would be the best solution. It would no doubt speed up the vehicular traffic on the streets, and thereby make for better service for the bus patrons. But the bus service is planned and operated on a quality basis—a seat for every passenger and a 10-cent fare. On that basis, there still remains the problem of handling the great bulk of the people on the low-fare, mass transportation basis; that is, the street car service. The problem then is whether it would improve the situation for Chicago street car riders to put the cars underground. Mr. Ritchie thinks that it would, because he says operation of the street cars in the subway would be so speeded up that the savings from this and other economies would offset the interest charges on the cost of the subway. But is this true?

A comparison of investments per dollar of revenue shows that for double-deck motor coach operation this amounts to \$1.25, for surface railways about \$4, and for rapid transit lines, subway and elevated, from \$10 to \$25 or more. From this it is apparent what a large saving must be effected in order to offset the cost of the railway when street cars are put underground.

The decrease in car hours due to increased speed and saving in operation from lower power consumption, relief from paving maintenance and snow removal will not be sufficient to meet these interest



charges. Experience in other cities, where surface car subways are in use, has shown that they were instrumental in so decreasing the net income available for carrying charges that it became necessary to increase the rates of fare. Of course, the surface cars can be put under ground solely as a means of relieving surface traffic congestion and to speed up service, but it practically becomes necessary to charge the cost, above the savings incident thereto, to the taxpayer. This is not good practice, to say the least, for any transportation system should meet its own cost of service. But to put the full burden on the car rider in such a case would cause an increase in fare out of proportion to the benefit he derives.

For example, with single car units or even two-car units it is impossible to secure the maximum use to which such an investment as is required for underground lines should be put. Even with long stations in the subway, 180 cars an hour at the most can be put over a single track in one direction, whereas with rapid transit type service, 400 cars an hour in ten-car trains are being put over one track. In New York, it was recently pointed out, the entire rush-hour traffic of the Fifth Avenue Coach Company could have been handled by one ten-car subway train every thirty minutes.

There is no question but that motor coaches can maneuver to better advantage through congested streets than 50-ft. surface cars. However, it seems that Chicago's main transit problem hinges more on quicker and better facilities to reach outlying points than to get through the congested business district. The bus has a greater place as a feeder to these rapid transit lines in the residential districts and as the sole means of transportation in the parks and on the boulevards, than as a substitute for the surface cars in the loop.

—[EDITORIAL]

## *Bus Operators Develop Snow-Fighting Equipment*

**T**HE art or business of snow fighting—keeping highways passable in spite of heavy snowfalls or drifts—is still in its infancy. This is true particularly when the mechanical equipment or machinery used for the work is considered. Without machinery, of course, organization and system are of little value.

Real engineering work has been done by bus operators in developing snow-fighting equipment. This has gone far ahead of anything used by the authorities. Highway departments have, in general, been content with the use of horse-drawn plows, with hand labor, or have applied the blades used in grading to the front of trucks or tractors.

Snow-fighting equipment, as developed by bus operators, really starts with the bus itself. A 25-passenger bus, with high-powered engine, is no mean instrument for fighting snow. In city work, or where the maximum snowfall is only a few inches, the bus can usually make its own way through, but on country highways, under exposed conditions, where high drifts are prevalent, something more powerful is required.

The simplest form of snow fighting apparatus used by city bus operators consists of a heavy plank hung diagonally under the bus, amidships. Applied to the buses used for schedule service, this has worked out successfully where the headways were sufficiently close so that no great amount of snow accumulated between trips.

The next step was to mount a clear or nose at the front of a motor vehicle, with control by hand wheel in the driver's cab. Such a plow must travel at fairly low speed, for otherwise flying snow cut off the driver's line of vision. The most advanced plow of this form is found in New York City, where the Fifth Avenue Coach Company has developed a four-wheel-drive truck carrying a shear blade at the front, and another between the wheels.

In country work the snow must be cleared from highways open to the winds and frequently filled with heavy drifts, so something still more powerful must be used. The snow can be pushed to the side of the highway usually in one passage of the snow-fighting apparatus, and it is not necessary to work only toward the curb, as is customary in cities.

On the other hand the drifts encountered vary not only in depth, but also in the density of the snow. Bus operators therefore have had to pitch in and develop adequate equipment. Single blade-set diagonally in front or amidships did not fill the bill. With heavy snow, it was practically impossible to keep the vehicle working straight ahead.

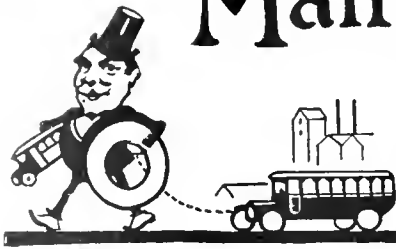
The solution to this difficulty was found when the single-shear blade was replaced by a nose plow, offset so the nose was well toward the left-hand side. Part of the snow was then cleared by the left side of the vehicle, which helped to keep it in line, while at the same time it pushed back to the right the greater part of the snow. Besides balancing the load, the left-hand part of the plow cleared the road for the rear wheel following it.

Most of these nose plows are equipped with a so-called levelling wing, a continuation of the plow structure, which takes the snow from underneath the wheel and throws it back from the roadway. Plows of this type have been used successfully on heavy passenger-car chassis travelling at high speed, and on trucks up to 2-ton capacity.

For still heavier work, when drifts tower five to eight feet or even higher, the plow with truck-tractor as motive power has been required. Here the amidships plow is broken up into two sections, with the nose mounted in front, and wings or levellers on each side. The nose plow lifts the snow, breaks it up, and turns it to the roadside. Finally the wings push it along into the ditches.

There appear to be at least four essentials for the motive power applied to snow-fighting work: Power, plenty of it, must be available at the road surface, where the real work is to be done. Good clearance under front and rear axles; also under radiators, which are thus kept clear of snow with attendant overheating. Balance or stability, which means that the plows must be co-ordinated with the motive power, so that the working vehicle can be directed along a straight, even path. Still a fourth requirement is ballast, properly distributed and concentrated over the driving wheels or treads.

# Manufacturers' Section



Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Sawing Wood for Bus Bodies

USED in a number of body shops where a limited amount of repair work may be handled, is the bench universal saw made by J. D. Wallace & Company, Chicago, Ill. This is a portable machine that can be operated from any electric lighting circuit. It is driven by a General Electric ball-bearing motor,  $\frac{1}{2}$  hp., which can be supplied for either alternating or direct-current circuits. At the side of the motor is a small hand wheel for tilting the saw to cut at any angle up to 45 deg. A second hand wheel, to the right, is used for raising or lowering the saw. The rip fence shown on the right-hand edge of the table is provided with a hand clamp, which can be locked in any position according to the width of cut. There is also a cross-cut fence, which can be folded back out of the way when not in use.

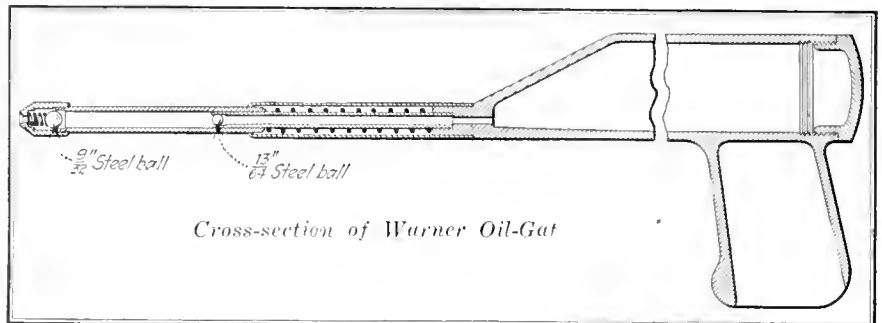
According to the manufacturer, this saw will handle any stock, including the hardest woods, up to 2 in. thick and from 5 to 6 ft. long. It is mounted on a stand, so that it can be moved to any working position.

The saw described here is only one

of a complete line of bench wood-working tools supplied by the same maker, including a 4-in. planer, a 6-in. jointer, and a 16-in. band saw.

## Hand-Operated Lubricating Device

THE Warner-Patterson Company, Chicago, announce the Warner Oil-Gat, which is said to give a pressure of more than two tons. This resembles a gun in appearance. It is 15 $\frac{1}{2}$  in. long, all in one piece, and



of convenient size to carry in a toolbox. The user takes hold of it as he does a gun, points the nozzle against the nipple, and pushes with one hand. There are no attachments to make before or after using.

It is possible to use a Warner Oil-Gat if a chassis is already equipped with the ball type nipples, but the maker urges the use of the Warner nipples, which instead of a ball is of concave construction. This permits the user to clean the nipple without forcing the dirt inside.

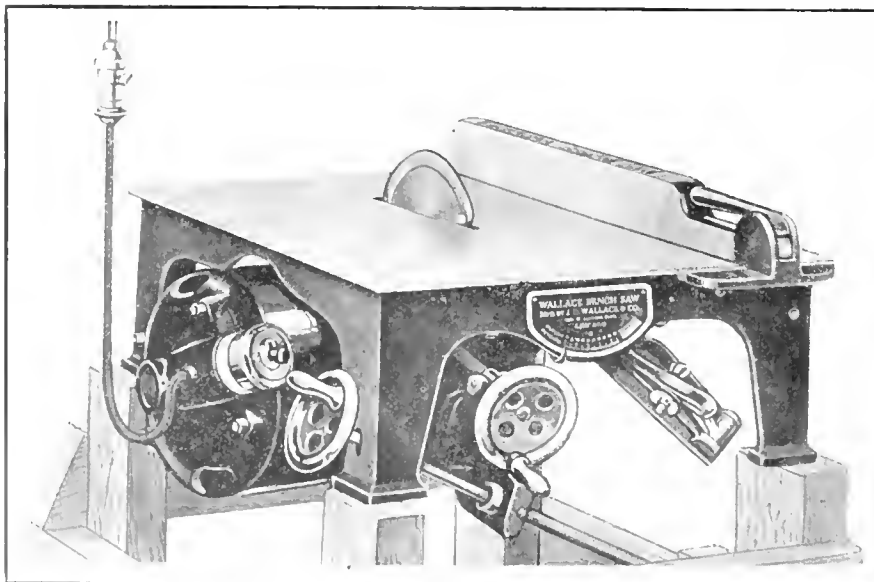
## Chassis Designed for Double- or Single-Deck Service

THE Model "P" chassis illustrated on the following pages, forms part of the line of the new Philadelphia motor coaches. This chassis, which is intended to carry either single-deck or double-deck bodies, is designed particularly for urban bus transportation, either for double-deck service under dense traffic conditions, or as a trolley feeder in territory where it is not desirable to make rail extensions.

As indicated in the cross-sectional view, the chassis is of the drop-frame type, with a kick-up over the rear axle. This permits a floor only 19 $\frac{1}{2}$  in. above the ground; from top of frame to ground the distance is only 18 in. The chassis is 24 ft. over all, with a 216-in. wheelbase. Complete, with a six-cylinder engine designed especially for this job, an oversize clutch and transmission, Hiflex suspensions, wheels and tires, the weight is about 8,750 lb.

The frame of the chassis is of heavy pressed steel, with a maximum depth of 9 $\frac{3}{8}$  in., and 3 $\frac{1}{2}$ -in. flanges. Material is mild steel, which is said to eliminate the danger of crystallization. The large dimensions of the frame serve to absorb rather than resist the short period vibrations due to road shocks.

The semi-elliptic springs are of chrome-silica-manganese steel, and front and rear the Hiflex suspension is used. This suspension consists of helical springs mounted on a



Wallace bench universal saw of self-contained construction

hinge device which operates between the spring shackles and frame.

In the power system the six-cylinder engine is a distinctly new development, which was designed by E. O. Spillman. The six cylinders, each 4-in. bore and 6-in. stroke, develop about 90 b.hp. at 2,400 r.p.m. Of the valve-in-head type, the engine has a seven-bearing crankshaft; a removable and interchangeable cylinder head to facilitate valve grinding at the bench; and cast iron pistons with slit skirts to insure positive lubrication.

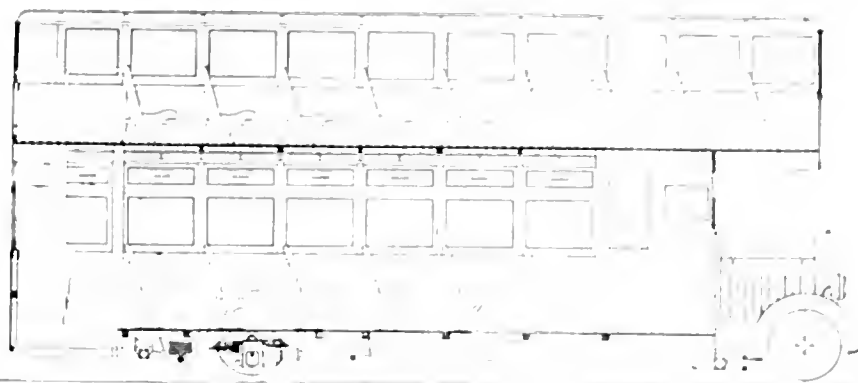
High-pressure force-feed lubrication is used throughout, even to the piston pins, which are of the full floating type. The pressure is controlled by throttle opening so that oil is supplied in accordance with the load, rather than speed of the engine. As the oil circulates it passes through a self-cleaning strainer. Another feature of the engine is the intake manifold, this containing a trapped hot spot into which all condensed vapors are drained. Here they are re vaporized so that a dry mixture is assured under practically all conditions.

The fuel system consists of a 50-gal. tank, mounted between the frame members behind the rear axle, this being made extra large so that it will not be necessary to fill the tank during daily operation. The tank is vented to the outside of the vehicle, and is filled from an opening back of the left rear wheel. Stewart vacuum system is used to supply gasoline to the 1½-in. Zenith carburetor, which is heavy-duty type with oversize throttle spindle, and a stuffing box on the outer end.

Cooling is by a 22-in. four-blade fan, and a finned flat tube radiator with aluminum shell; top and bottom tanks are sheet copper, and through them water is circulated by centrifugal pump. By adjusting the blade area and pitch of the fan, the water temperature can be kept down to 185 deg. in all localities.

Battery ignition is standard, although a magneto may be mounted if desired. The battery is 12-volt, 180-amp.-hr. capacity, mounted in two trays to facilitate handling. Other electrical equipment includes a 600-watt generator and a back-gear starting motor with Bendix drive.

Exhaust pipe leads to the extreme rear of the chassis, through a large muffler. Ahead of this muffler an



*Cross-section of new Philadelphia design, showing underlong rear axle and two doors on right-hand side.*

adjustable control valve is inserted, to which the bus heating system is attached.

Clutch and transmission are Brown-Lipe, the former of the multiple dry-disk type, and the latter having gears with ground teeth. There are four speeds forward, with 4:1 reduction on low. Service and emergency brakes are mounted on rear wheels and are of the internal expanding type having total effective braking area of 730 sq.in.

At the rear is an Atlas LC-12 cranked-type internal gear axle with a 6:1 reduction. Front axle is Shuler, of I-beam section, and dropped-center type, to provide clearance under the engine. Steering gear is Ross, with a 20-in. handwheel and a 10:1 reduction. Road wheels are of malleable iron; solid tires, 34 x 6-in. front and 34 x 6 dual rear.

The complete control system has been worked out to meet the convenience of the driver. Spark and throttle controls are carried on a quadrant on the steering column, above the handwheel. In the cen-

ter of this steering column the horn button is mounted. Switches for chassis lights and ignition are so placed that the operator can manipulate them without removing his eyes from the road. Gearshift and hand-brake levers are mounted in an independent control set within easy reach of the driver's right hand. The driver's compartment is entirely separate from the body of the bus, and has curtains to eliminate windshield glare.

Several different designs of bodies can be applied on the Model "P" chassis. The one shown here is a sixty-five-passenger double-decker of the semi-inclosed type. By eliminating the overhang over the hood, four less seats may be used. The design is for either one-man or two-man operation; with the latter the prepayment system can be used, the conductor standing at the entrance to the semi-circular stairway. Here a fare box can be installed, or some other form of fare registration.

The upper deck is of the semi-inclosed type, with roof over the



*Left-hand view of new Philadelphia motor coach*

seats, and open aisle. This was developed originally on Detroit double deckers.

To give the driver complete control of the vehicle, and make it unnecessary for the conductor to mount the stairs to warn passengers against overhead obstructions, a clearance signal system has been installed. When such an obstruction is about to be encountered, the driver turns on a green bull's-eye at the rear; the light from this is directed along the center aisle to a mirror at the front, and thence reflected through other mirrors so it can be seen by the driver. If anyone is standing in the aisle, this light does not appear, so that the driver immediately stops.

At the same time that the driver switches on the rear bull's-eye, he also lights an electric sign calling attention to the danger, this being

mounted at the front, so that any passengers facing forward will read it and be warned of the danger. An audible signal warns any passenger who may be standing, to resume his seat. All these warnings are of the positive type, so in case of mechanical trouble the driver would stop and make sure everything overhead was clear.

The coach is of ash, reinforced with steel; panels and roof are Haskellite. In the interior there are nine pendant fixtures, each of the 12-volt, 40-cp. gas-filled type. This gives about 6 foot-candles on the reading plane, or almost twice the light in the ordinary trolley car. The heating system is 2½ in. outside diameter pipe, leading from a Y-connection and a Petry heater valve.

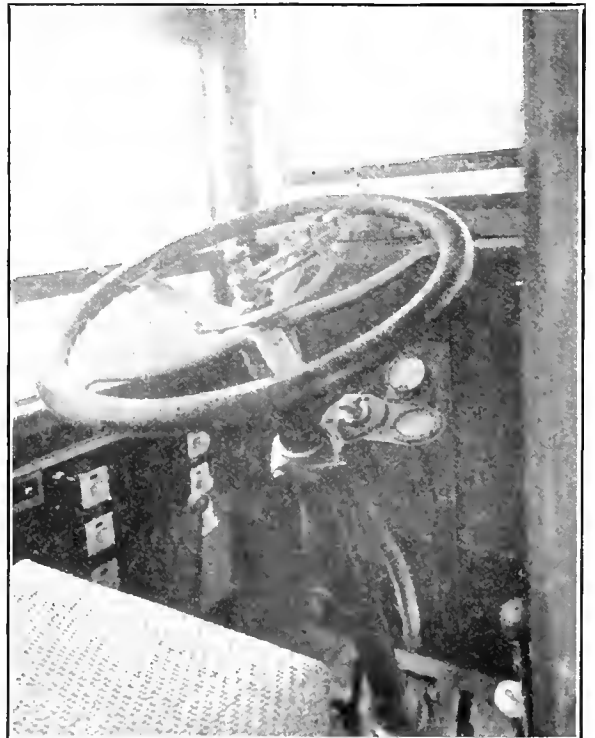
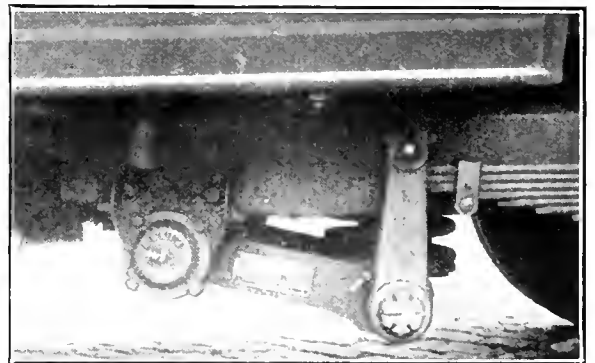
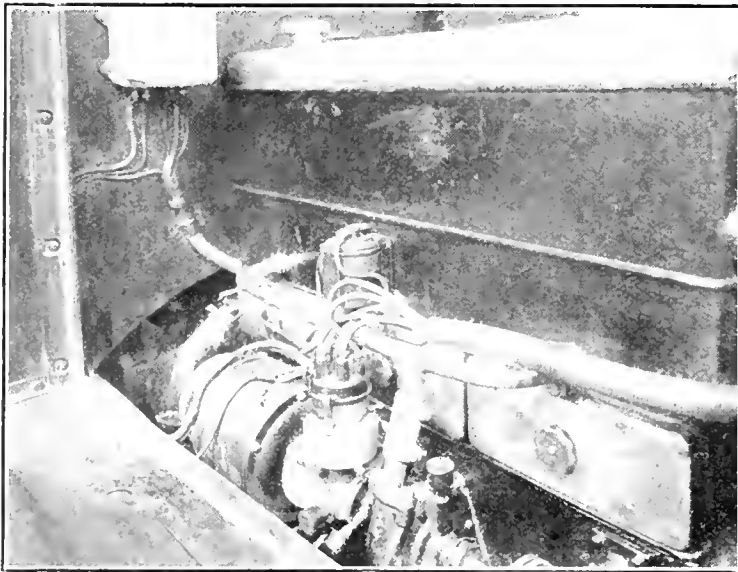
Ventilation is by fourteen louvers mounted along the side and in

the rear of the body. Sash on both decks is of the drop type. The floor on the lower deck is covered with linoleum, while wearing strips are placed on the upper-deck floor.

To the top roof the double decker is 12 ft. high, this giving a 6-ft. headroom under the roof of the lower deck, and a 4-ft. headroom on the upper deck, where passengers will, of course, be seated only. The upper deck is protected by inside curtains which can be dropped down between the supporting stanchions.

### Spring Type Universal-Joint for Bus Service

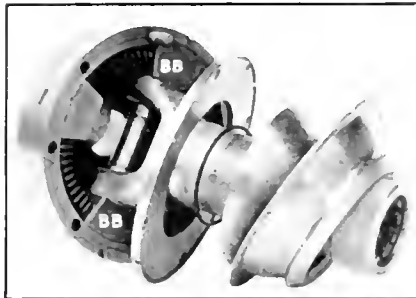
THE Hoosier Universal Machinery Company, Goshen, Ind., has developed a universal joint in which helical springs actually form part of the driving system.



*Close-up of Model P Philadelphia coach. Right-hand side of engine with accessories. Hillex suspension on rear springs. Front axle with dropped center. Driver's position*

As shown in the accompanying illustration, there are two yokes, attached to the shafts in the usual way. Through one yoke a pin passes into an outer casing, this locking the yoke and casing together. The two are separated, however, by a pair of bushings, marked BB. The other yoke has projections on each side which extend only into another pair of bushings. Thus the bushings are set 90 deg. apart inside the casing. The free yoke is on the transmission or driving end, so that power is carried from the shaft through the sliding bushings, thence through the springs to the second yoke.

The springs furnish a torque cushion, which is said to prolong the life of clutch, bearings, gears and axle shafts, and at the same time to provide greater riding comfort for pas-



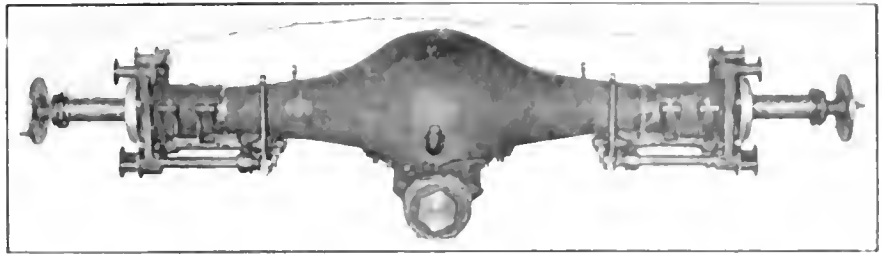
*Taken-down view of Hoosier all-metal joint with light-fitting cover which contains felt washer*

sengers. These springs are held concentric by arms extending from the ends of the bushings, and fitting inside the springs themselves. The arms are so spaced that they butt when excessive torque is exerted, so that it would never be possible for the springs to be compressed solid. It is said also that the joint is tight and noiseless, since the springs are inserted into the casing under compression.

For heavy duty service, such as would be required with buses, two rows of springs are used, the four bushings being employed as before, but each having two arms on each side.

### Underslung Worm Axle for Fageol Coaches

IN THE accompanying illustration is shown a rear axle produced by the Timken-Detroit Axle Company, Detroit, Mich., especially for the Fageol Safety Coach. This axle is of the underslung worm type, with the worm swimming in a bath of oil. Live axles are full floating, the



*Timken-Detroit underslung worm Axle, for 20 in. wheel gage*

entire weight due to the vehicle being carried on the tube of the housing. With this construction, the wheel will not drop off, even though a drive axle should break. Axle pullers are built integral with the hub cap, so the live axle can be removed without disturbing the wheels.

In order to simplify the service problem, all gears, bearings, spindles and small parts are interchangeable with those used in other Timken commercial (truck) axles, and can be obtained in any large city.

### Rotary Apparatus to Fight Snow

THE Fox Rotary Snow Broom Company, Newark, N. J., is putting out a rotary device which can be mounted, during the winter, on the chassis of a 3 to 5-ton truck, and then stored during the summer so the truck chassis can be used for other work.

All parts of the snow-fighting attachment are mounted on a frame made of standard structural steel shapes and blue annealed sheet-steel plates. This frame is secured to the truck chassis by U-bolts, which can be easily removed.

The actual cleaning is done by a broom 9 ft. wide mounted at the front of the vehicle; this can be replaced by a steel-blade turbine for heavy work. The broom is rotated by power transmitted through shafting, Morse silent chain drive, and bevel gears, from an independent

gasoline engine mounted above the truck chassis. The broom shaft is counter-balanced so that it can rise vertically when an obstruction in the road is encountered; it also can follow irregularities in the road surface. The construction is such that the operator, from his seat in the cab, may raise the broom clear of the road surface.

The shaft carrying the two parts of the broom is made of cold-rolled steel, and is 2-in. diameter. It is suspended at both ends and in the center. The broom is 34-in. diameter, the two sections being spaced 10 in. apart. They are made in halves and are clamped to broom seats on the shaft. The bristles are 4-in. rattan, which will give about 100 hours of continuous life.

In heavy snow fall, the maker states, the vehicle can run from 12 to 14 m.p.h., and that with the turbine equipment it has cleared as high as 7 ft. of snow. The rattan broom, however, is adequate to cope with ordinary snow falls.

For use in city work an apron or shield of steel plates with heavy side curtains is provided. The sweepings of snow are then laid in a windrow so that they can be removed easily. In the open country, however, this apron is swung upward, so that the snow is thrown well clear of the road.

The same equipment can be used during the summer for street sweeping, in conjunction with a tank that supplies water for sprinkling.



*For rotary equipment as mounted on front of heavy-duty motor truck. Either rattan broom or steel blades (turbines) can be used to clear snow*



## BUS TRANSPORTATION

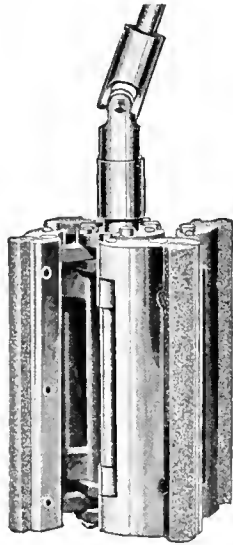
Trade Name and Model	Capacity, Seats	Main Dimensions				Engine Details										Electrical Equipment				Transmission		Axles		Wheels		Tires					
		Unloaded Weight, Lbs.	Wheelbase	Gage, Front	Gage, Rear	Floor Height, In.	Steering Dia., Ft.	Normal Speed, M.p.h.	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Battery	Battery Volts-Hr.	Starter	Generator	Clutch		Gearset	Front	Rear	Final Drive		Steering Gear	Springs	Brakes	Maker	Type
																				Chassis	Bus										
Light Duty	14	3,050	4,250/129	56	33	54	28	7	Cont.	31x5	V Ryd	T	Own FC	Eisc-M	Wld	6V69	Wes	Bsh	BgBk DP	Cotta-3	Tim	Tim SF	W	Ross	Dtrt	R	Bimel	Wd	35x5		
Light Duty	18	1,830	4,000/129	56	33	42	20	6	Own	31x4	V Smbg	P	Own C	Eisc-M	Wld	6V80	Rem	Wes	Own DP	Own-3	Torb D	Torb D	IT	Ross	Mthr	R	Haym	Wd	35x5		
Light Duty	18	1,830	2,810/120	56	36	33	25	6	Own	31x4	G Znth	P	Harri-H	Eisc-M	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	Tim SF	W	Ross	Mthr	R	Haym	Wd	35x5		
Light Duty	10	2,900	4,200/127	56	36	27	35	1	Cont.	31x5	V Znth	C	Long FT	Eisc-M	Wld	6V80	Ejr	Bjr	BrLp MD	BrLp-4	Tim SF	Tim SF	W	Jax	Perfet	R	Dist	Wd	35x5		
Light Duty	12	2,950	3,850/124	56	36	24	30	22	Own	31x4	V Znth	C	Long FT	Eisc-M	Wld	6V80	Own	Own	BgBk DP	Plan-2	Tim SF	Tim SF	W	Own	Perfet	R	Dist	Wd	35x5		
Light Duty	12	1,430	3,300/124	56	36	22	22	6	Own	31x4	G Mvrl	P	Own FT	Eisc-M	Wld	6V132	Own	Own	Own DP	Plan-2	Tim SF	Tim SF	W	Own	Perfet	R	Dist	Wd	35x5		
Light Duty	14	1,430	3,300/124	56	36	22	22	6	Own	31x4	G Mvrl	P	Own FT	Eisc-M	Wld	6V132	Own	Own	Own DP	Plan-2	Tim SF	Tim SF	W	Own	Perfet	R	Dist	Wd	35x5		
Light Duty	15	2,625	4,225/140	56	36	33	40	25	Dodge	31x4	V Smbg	CP	Dodge T	Eisc-M	Wld	12V52	NE	NE	Dodge MD	Dodge-3	Dodge	Dodge	W	Own	Perfet	R	Dist	Wd	35x5		
Light Duty	15	3,200	4,225/140	56	36	33	40	25	Dodge	31x4	V Smbg	CP	Dodge T	Eisc-M	Wld	12V52	NE	NE	Dodge MD	Dodge-3	Dodge	Dodge	W	Own	Perfet	R	Dist	Wd	35x5		
Light Duty	14	2,760	3,310/124	56	36	24	30	7	Lyemg	31x5	V Smbg	CP	McCol-P	Eisc-M	Wld	6V100	AtL	AtL	Nice DP	Nice-3	Torb D	Torb D	IG	CAS	Std.	R	Indes	Wd	35x5		
Light Duty	15	3,350	4,700/155	56	36	30	45	10	Cont.	31x4	V Znth	CP	Fdrs. H	Eisc-M	Wld	6V120	Bsh	Bsh	BrLp MD	BrLp-3	Sal	Sal	SB	Gmr	Shldn	R	Indes	Wd	35x5		
Light Duty	16	3,350	4,700/155	56	36	30	45	10	Cont.	31x4	V Znth	CP	Fdrs. H	Eisc-M	Wld	6V120	Bsh	Bsh	BrLp MD	BrLp-3	Sal	Sal	SB	Gmr	Shldn	R	Indes	Wd	35x5		
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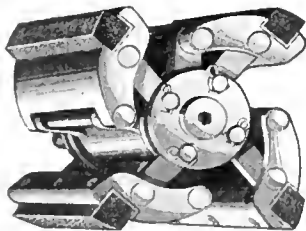
## Honing Tool for Cylinder Bores

WHAT is known as the "Ammco Centrimatic" hone is being marketed by the Automotive Maintenance Machinery Company, Chicago, Ill. This tool, of which two views are shown, is said to be self-adjust-



*Side view of Ammco hone in collapsed position*

ing, self-centering and self-aligning. The abrasive honing stones are mounted in wings which are hinged at both ends to rigid arms of a central spider. When the hone is rotated, these wings are thrown open and the stones forced against the bore of the cylinder. Links are attached to the wings at one end and to a pair of disks at the other, so that the travel of one wing produces an equal radial travel on the part of the other three, thus keeping all the stones equally distant from the center of the hone. Because of this construction it is claimed that cylinders can be cut to a true bore, provided they are only a few thou-



*End view of hone with wings expanded on central spider*

sandths of an inch out of round or tapering.

The diameters on which this hone can be used range from 2½ in. to 5 in. For cylinders from 4 to 5 in. diameter, a set of extension blocks

must be installed, as shown in the illustration.

The maker recommends that the hone be driven at a speed from 800 to 1,100 r.p.m. The driving power may be a portable electric drill, a standard drill press, or a multi-spindle honing machine.

## Safety Shield

THE Hoover Commercial Company, Inc., New York, N. Y., is putting out the shield shown in the accompanying illustration. This is said to be transparent as well as protective. A green visor is mounted in an aluminum one-piece frame, which can be supplied in lengths ranging from 36 to 46 in., graded in 1-in. series. Two sizes are made, one 3½ in. wide by 2½ in. deep, and a smaller size 2½ in. wide by 1½ in. deep. The shield can be quickly at-



*Hoover shield as mounted above windshield.*

tached to any vehicle by the use of a screwdriver. It requires only four screws for a closed vehicle.

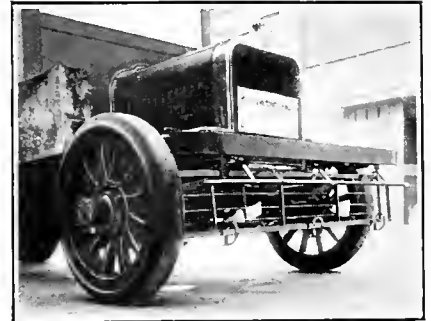
The device gives the driver clear vision, it is said, under the most glaring light conditions, whether from sun, snow or headlights.

## Fender Serves Also as Bumper

THE Pohlig fender, made by The Peele Company, Brooklyn, N. Y., is designed to prevent serious injury to victims of head-on collisions. The maker states that this device has been approved by the Underwriters' Laboratories, and vehicles equipped with it have been granted substantial reductions in liability insurance premiums.

As shown in the illustration, the fender consists of a bumper made of structural iron, a horizontal trip

bar, mounted several inches below and in front of the bumper, and of the fender itself. Since the trip bar is at the extreme front of the vehicle, it hits the person who is struck first, thus releasing the fender; this drops



*Safety fender attached to heavy duty vehicle.*

to the ground and prevents the victim from being crushed beneath the wheels, pushing him along in front of them instead.

The method of attachment, it is said, is very simple. The bumper is locked to the chassis with adjustable U-bolts, and the fender is attached to the same U-clamps or spring clips that hold the spring and axle together.

## Pneumatics for Heavy Duty

THE Mason Tire & Rubber Company, Kent, Ohio, has brought out a line of cord tires for taxicab, bus and truck service. These "True Value" cords are available in sizes up to 40x8 in. As shown in the illus-



*Mason cord tire developed for bus work*

tration, the tread is of the non-skid type. Heavier construction is used throughout, it is said, the 36x6 tire being of ten-ply construction, while the ordinary standard tire is only eight ply. The tread stock is extended from bead to bead so as to take care of scuffing. The sidewalls are made smooth so that they will not easily nick in hitting ruts or curbstones, such as might happen with the strips or projections sometimes used.

# What the Associations are doing



News and happenings  
of the associations  
Proceedings of interest  
to the bus transportation  
industry

## Shoeing a Car With Low-Pressure Air\*

BY J. E. HALE

Manager of Development Department,  
Firestone Tire & Rubber Company, Akron, Ohio

**T**HERE are good reasons for believing that the automobile industry is on the threshold of the third great development in pneumatic tire construction.

The motor car industry grew and expanded through its development years on square woven fabric tires of rather small cross-section. The art of building tires was new and our best constructions in those days were the small, stiff carcasses which naturally called for high air pressures.

The employment of cord fabric in carcass construction was the second step in advance in pneumatic structure. By virtue of this change in carcass construction, together with the realization of the importance of more ample sections, tire mileages were greatly increased, with a corresponding reduction in cost. There was not only a mileage increase, but the tires were much more reliable and not subject to such exasperating failures.

It is possible that with the consummation of the improvements now under development, the third step is ready to be entered upon. In this move we will take advantage of the cord construction which has provided its durability and reliability, combined with a much larger section and thinner wall.

This newest development, the air cushion tire, is the result of a deliberate attempt to make riding on low-pressure air possible. It is the natural consequence of a strong conviction on my part that there ought to be a way to accomplish it that led the Firestone Company to take the bold step in going to an extreme and providing carcass flexibility, and a section size sufficient to give a larger area of contact.

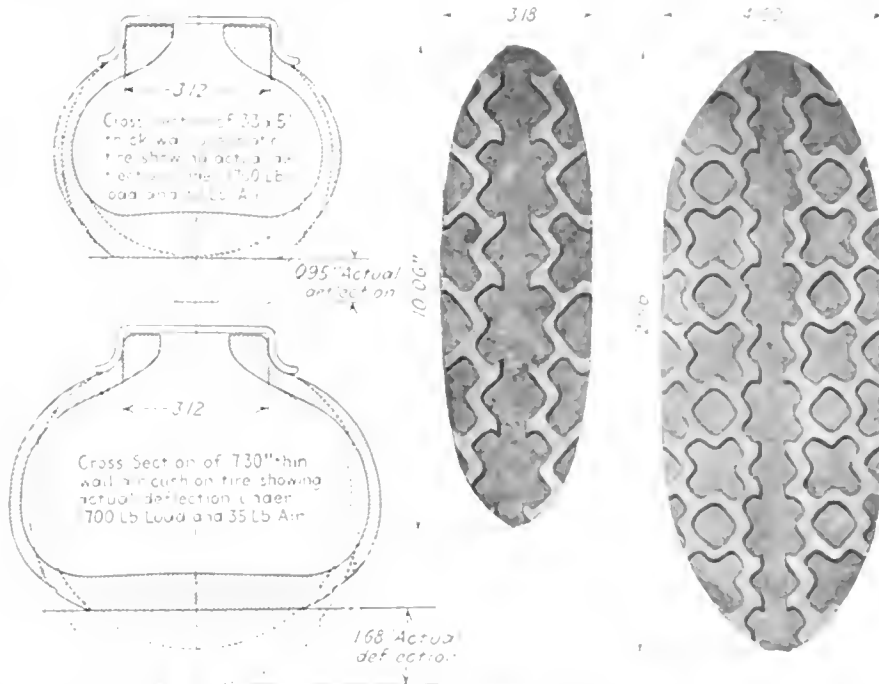
The fundamentals of this movement are comparatively simple. If we are to have greater cushioning for comfort and protection against vibrations of the car, the combination of low air pressure and large area of contact must be provided, and by employing such tire constructions that the tire durability may not be impaired. The goal aimed at was to increase the area of contact sufficiently so that air pressures ranging from 20 to 35 lb. could be employed in actual practice.

In a general way the contact area of the tread with the road expressed in square inches multiplied by the internal air pressure will give a figure which approximates the load resting on the tire. This is as it should be. It is evident that if a 1,000 lb. load is to be imposed on the tire, and due to the limitation in the amount of vertical deflection not more than 20 sq.in. of

contact area is available, the limitation of the actual vertical deflection of the tire, expressed as a percentage relation of the sectional diameter. It has been found that if the percentage of deflection is exceeded, the tire is likely to fail prematurely from two causes. First, tread separation and ply separation are likely to be excessive; second, the flexing load set up by the sidewall and carcass distortion favors the inside ply. It can be readily appreciated that in the case of a thin-walled tire, the destructive effect of this flexing will be much more pronounced than in the case of a thick-walled tire. But if we use low pressure air, the burr to get more on the carcass are low enough so that only a few plies are necessary, and this in turn permits increase in deflection percentage.

### EFFECTS ON OPERATION

There seems to be a definite list of questions which arise regarding the application of air cushion tires and their effects on car operation. Probably the most frequent is the effect on fuel



Outside and inside of new balloon tire, as compared with standard tire. At left, cross-sections with and without load; right, contacts made on road surface.

contact can be obtained, it will require 50 lb. of air to carry the load. If, however, we can devise some way of increasing the area and still not exceed the proper degree of deflection, for instance if we can increase the area to 50 sq.in., it will require very much less pressure, and in this case only 20 lb., to carry the same load. There is shown here the tread imprint of a 7.30 air cushion tire compared with the 33x5 high-pressure pneumatic, each tire having been loaded to 1,700 lb., but with 35 lb. of air in the air cushion tire and 65 lb. in the 33x5. The vertical deflection enables one to visualize the cross-sectional difference.

One of the fundamental conditions of

consumption. In general, the air cushion tires consume no more and no less fuel than the high pressure pneumatic. A number of private owners have found that they received a slightly greater mileage per gallon with air cushion tires. Our most authoritative information, however, is our observations on six taxicabs running a total of 20,000 miles during the month of April on 7.30-in. air cushion tires, and averaging 13.5 miles per gallon. This compared with 12.6 miles per gallon for a larger number of similar cabs covering many times that mileage on 33x41-in. sixty tires with 70 lb. of air.

It appears that in the case of the regular pneumatic tires with a smaller

\*Abstract of paper at semi-annual meeting, Society of Automotive Engineers, held June 19-23, 1923, at Spring Lake, N. J.

tread contact, the internal carcass friction, rather than the tread rolling resistance absorbs energy. On the other hand, in the case of the air cushion tires, the carcass being so thin as to have practically negligible carcass friction, the large area of contact occasions a much greater degree of road friction than in the case of the regular pneumatic tires, and it is probable that these effects in the two classes of tires would just about balance each other.

With air cushion tires, the cars coast just as freely and accelerate practically the same as with high pressure pneumatic tires. This was shown by acceleration and coasting observations made on a Packard car equipped alternately with 7.30-in. air cushion tires having 25 to 28 lb. of air, and with 33x4½-in. tires having 50 to 55 lb. of air. The tests were made without disturbing the brakes or bearing adjustments, since the wheel changes were made by simply switching demountable disk wheels.

#### EFFECT ON STEERING

Most drivers have discovered that when their front tires are soft, there is a slightly increased resistance in steering. From laboratory tests we have found the area of contact of the air cushion tires with the road surface to be about twice that of the high pressure pneumatics, and under these conditions one can detect a slight difference in turning the wheel. In ordinary driving, this effect is of such minor consequence that it cannot be considered a serious handicap. We do find, however, that when the car is in close quarters parked by a curb, it is somewhat more difficult to pull the wheels around when the car has little or no headway.

The traction and braking control of the car in driving is probably of equal importance with fuel consumption and ease of steering. On wet pavements (with the brakes properly equalized) I have tried every way that I could think of to make my car skid, but so far the only thing which happens is that the car stops. By this I really mean to convey the idea that in the most ticklish traffic, I have no fear about what I can do in an emergency. The large area of contact combined with the greatly increased lineal total of non-skid edges which gives a squeeze effect, is undoubtedly the combination which gives such excellent non-skid results.

In contrast to wood block or asphalt are cases of uneven pavement surfaces where the actual area and button edge contact is cut down by the road surface irregularities. In the case of the air cushion tires, the area is so large and the carcass so flexible that it folds and rolls over the dips and hollows in the road surface so as to maintain a uniformly large area of contact at all times. This is not so in the case of the high pressure tires which are inflated so hard that they lose a good deal of their contact, with the result that the air cushion tires hold much better on rough pavements.

### Meetings, Conventions and Exhibits

August 13-14—Pennsylvania Automotive Association, Philadelphia.  
Aug. 21—Bus Body Section, Auto Body Builders' Association, Organization Meeting, Detroit, Mich.  
Aug. 27-30—Green Bay Association of Commerce, Annual Automobile Show, Green Bay, Wisc.  
Sept. 3-8—Motor Dealers' Association, Annual Show, Sacramento, Cal.  
Sept. 19-22—Motor and Accessory Manufacturers Association, Fall Convention, Boston, Mass.  
Oct. 1-5—National Safety Council, Exhibit, Buffalo, N. Y.  
Oct. 25-26—Society of Automotive Engineers (Production), Cleveland, Ohio.  
Nov. 12-17—Automotive Equipment Association, Annual Business Exhibit and Convention, Coliseum Chicago.  
Dec. 19—Philadelphia Motor Truck Association, Philadelphia, Pa.

While the car can be driven much faster over the average highway, with the almost complete elimination of vibration, I am wondering whether this higher speed may not lead to more or less serious consequences from another source. Will the powerplant and transmission system stand this speed without suffering? Naturally the conclusions on this point will have to be drawn by those skilled in observing such things and particularly by making direct comparisons with tires on the old equipment. It is my opinion that the increased speed will amount to somewhere between 10 and 30 per cent. For some reason which is not clear to me, cars equipped with air cushion tires develop a violent galloping when they are not equipped with snubbers or shock absorbers.

At the present time it appears that the amount of gather or toe-in on the front wheels will have to be nicely adjusted to prevent the excessive wear which appears with improper alignment. Our observations point clearly to the fact that air cushion tires are more sensitive to improper alignment than the high pressure pneumatics.

There are two features of car operation which register against air cushion tires; the mud splashing and dust raising propensities. The larger section tires with the greater area of contact spatter mud much more than any other tires heretofore brought out, and as for dust raising on country roads, it is terrible.

#### DURABILITY AND COST

All our development work on air cushion tires has been carried out under actual road test conditions. To date we have run a total of 850,000 tire-miles under test observations, and evidence points to average mileage at least as high as those enjoyed with regular pneumatic tires. The character of the failures will unquestionably be somewhat different. For instance, ply separation and tread separation will be minimized in air cushion tires, and with these eliminated, the most prominent troubles will be fabric breaks in the

carcass; also punctures and rapid tread wear on the front wheels when they are not aligned properly. Many people have questioned whether or not with such a thin tire, punctures will not be sufficiently numerous to be of considerable annoyance. There are no grounds for concern on this score. In 50,000 car-miles of operation on our test fleet, there were seven punctures, and in 100,000 miles of operation in taxicab service, there was an average of one puncture for each 3,700 cab miles. The explanation is found in the fact that the tire, being not so taut and hard and drum-like, yields rather than being pierced by the puncturing object.

The light carcass structure necessary in these tires also raises the question as to whether they have the stamina to stand the rough usage to which the heavier cars are often put. A large measure of our road-testing development was on tires of the four ply construction. Their performance under test conditions is repeatedly showing almost unbelievable ruggedness. No part of the tire is subject to high intensity of stress at any one point, which is quite contrary from the high pressure pneumatics. There is no doubt but that this lessened intensity of pressure is responsible for the almost complete absence of tread and ply separation.

#### Bus Body Builders to Organize

A MOTOR bus section of the Automobile Body Builders' Association is to be organized as a result of a demand voiced by bus body builders attending the third annual convention of the association in Detroit, Mich., June 26 and 27. Invitations have been sent to some 250 bus body manufacturers asking them to attend a special meeting in Detroit, Aug. 21, for the purpose of establishing a permanent organization.

The June convention of the Automobile Body Builders' Association was characterized by a large and enthusiastic attendance. The president of the association, Francis D. Willoughby, Utica, N. Y., delivered an address on the fundamental and underlying conditions in the automobile industry and their present and future effect on the automobile body industry. According to Mr. Willoughby, there is an ever-increasing demand for closed bodies, and manufacturers would like to devote 75 per cent of their production to this type of car rather than 33½, the present percentage.

The group meetings proved to be a valuable feature of the convention. The various sections included the manufacturers of passenger, bus and commercial bodies, upholstery fabric, body hardware, paint and varnish, decorative hardware, coating material, windshield and glass, structural material, leather and mill supplies.

E. T. Thompson, president E. T. Thompson Company, Pittsburgh, Pa., in the course of an address, outlined the history of body building.

\*From lecture given May 15, 1927, before the Institute of Transport, London, England.



The designer must also arrange the chassis so that all wearing parts are easy of access for adjustment and replacement. Every unit of the chassis should be easily replaceable by a fresh unit without removing the body.

Silence in running must carefully be watched, as each omnibus must undergo a noise test before it is approved by the licensing authorities. In the early days there was considerable difficulty in getting approval on account of noisy gear boxes; this was overcome by the introduction of the chain gear box, but even chain gear boxes, if slightly overstressed, can become as noisy as any spur gear box. The most nearly silent box today is the constant mesh helical gear, with which all the "N.S." omnibuses are equipped.

#### DESIGN OF THE FUTURE

It is not improbable that the vehicle of the future will differ in many respects from the latest type of London omnibus.

As far as the engine is concerned, it seems likely that water cooling will be eradicated. The saving in weight, with water cooling eliminated, would be an important point. The engine of the future will probably be an air-cooled multiple-cylinder unit, running on cheap fuel, and have a high compression. It may even be possible to design an engine running on crude oil.

In my opinion, the transmission of the future will undoubtedly be of a mechanical type, because every time power is transformed some proportion of the original input is lost. The time will come when there will probably be seen a mechanical variable gear which will have a greater range of speed than any gear box at present in use.

Fuel is undoubtedly being wasted in all existing designs, when the vehicle is running on the level on light loads, with the engine turning at high speed. If there were an infinitely variable gear which would permit of gearing up when going along the level, the engine speed could be reduced at any given road speed, and a greater economy obtained.

So far as the rear axle drive is concerned it is difficult to see how it is possible to improve on the existing design. The present efficiency of a worm drive is such that there is only a matter of 2 or 3 per cent loss. The differential in some form or another must remain. Some light cars at present have no differential, but anyone who has driven one will realize the impossibility of dispensing with the differential in any vehicle having an empty weight of more than 1,120 lb.

There is one other development which may or may not take place so far as passenger-carrying vehicles are concerned. I refer to the possibility of putting a vehicle on the road which will lay its own track. The great advantage of a system of this kind is that the pressure per unit area is greatly reduced as compared with a vehicle having the orthodox wheels.

There are many disadvantages in the present track-laying system, but it is conceivable that something may be perfected in the future, which will again entirely alter existing means of heavy transport.

#### COMMENTS ON FIFTH AVENUE PRACTICE

G. A. Green, of Chicago and New York, in his paper published in *BUS TRANSPORTATION* (see July, 1922, issue, page 369), suggests that the low center of gravity reduces rolling. This is incorrect, in my opinion. Undoubtedly, the rolling angle is dependent on the height of the center of gravity of the sprung weight from the spring seats and not on the height of the center of gravity of the whole mass from the ground level. The lower center of gravity does, of course, improve the overturning angle and renders the vehicle more stable.

Mr. Green recommends the push-on hand brake, vertical pivot pins, and progressive springs. On these points I am not in agreement with him, since it is impossible to use the hand and foot brake in conjunction and obtain

the maximum effort with each, and the small amount of time which is saved in applying the brake is certainly wasted while the vehicle is actually stopping in an emergency, due to the smaller power applied.

With reference to the suggestion made by Mr. Green as to the advantage of vertical steering pivots, the lifting effect which has to be overcome by the driver when steering a vehicle with inclined pivots and which is stated to render the steering very hard, is actually an advantage. The "S" type steering cannot be complained of, and the inclined pivots are of great assistance in quick recovery after making a turn, this being a most desirable feature; and the inclination of the pivot also reduces the road shock to the steering gear by bringing the contact line of tire and swivel pin closer.

The use of progressive springs has exactly the same effect as is obtained by the use of volute springs, but it has the disadvantage that the spring leaves are subjected to varying degrees of stress and, consequently, are far more liable to fractures.

### Wildcat Operators Discussed at Washington Association Meeting

**L.** D. CONRAD, of the Department of Public Works, state of Washington, contributed valuable information on the attitude of the department toward bus operations at the annual meeting of the Washington Auto Transportation Association held in Tacoma, July 10. Following his address he answered questions on legal or regulatory problems which the operators had found confusing.

Chief among the topics considered at the meeting were: curbing the operations of wildcat stages; classifying gross receipts on which a tax of 1 per cent must be paid to the Department of Public Works; presenting proper methods of advertising, and adopting an Association insignia. A resume of California Association activities and the recent legislation in that state was presented by N. A. Bowers, Pacific coast editor of *BUS TRANSPORTATION*.

The question of the best method of putting a stop to wildcat operations occupied a large share of attention. It was decided that a test case be presented to the Supreme Court of the State as quickly as possible. Once the illegality of such operations has thus been established it was believed that an injunction could be secured in a lower court on each case of illegal operation and that if operations still continued, citations for contempt of court could be secured.

This procedure was considered preferable to the alternative of instituting criminal proceedings against the illegal operators because of the uncertainties of jury trial, particularly in territory served by the wildcat operators. Several flagrant cases of illegal

operation that cut into the business of certified carriers were cited and the committee on wildcat operations was instructed to retain legal talent and get some suitable test case through the Supreme Court as quickly as possible.

One of the points particularly requiring legal action is the definition by some court authority, preferably the Supreme Court, of the term taxicab. Taxicabs are not under the jurisdiction of the Department of Public Works and are not subject to the same regulation as stages. Cars wishing to evade the law, therefore, obtain licenses as taxicabs and then operate just ahead of stage schedule over the same runs served by the stages. The definition suggested by Mr. Conrad to cover this situation is that "A taxicab is a vehicle entirely at the disposal of and under the control of an individual employing the same for a fixed service, and at a fixed charge, which individual is entitled to the occupancy of the said vehicle to the exclusion of all others."

The election of officers for the ensuing year resulted as follows: President, A. C. Ellington, Des Moines Auto Company, Seattle; treasurer, George Yost, Yost Auto Company, Seattle; directors, J. L. Johns, Tacoma-Olympia-Aberdeen Transportation Company, Olympia; H. S. Hawley, Auto Interurban Company, Spokane; William McKee, Monroe-Snohomish-Everett Stage Company, Everett; Frank Hickey, Tacoma Transit Company, Tacoma; R. T. Whiting, Stone & Webster Corporation, Seattle; W. T. Crawford, Camas Stage Line, Vancouver; and W. S. Kennedy, Kay & Bee Stage Company, Aberdeen.



# News of the Road



From wherever the bus runs, are brought together the important events, here presented to show the movements of the day.



## Mayor Accused in Bus War

Permit Granted by Buffalo Mayor for Temporary Operation on Bailey Avenue Protested by Railway

BUFFALO'S bus war appears to be rapidly approaching a climax. Following the operation of buses on Bailey Avenue by the Van Dyke International Tours, Inc., for two weeks under permits issued by Mayor Frank X. Schwab, the International Railway, which also desires to run buses on that route, instituted legal proceedings aimed to bring about the arrest of the Mayor on a charge that he had conspired with the Van Dyke Bus Company, owner of the International Tours, to violate the transportation corporation laws. The company was charged with violating those sections of the code which provides that permission to operate public conveyances in the streets must first be obtained from the Public Service Commission.

Judge Hager, of the City Court, on July 16 issued warrants for the arrest of the officials of the Van Dyke company. He said: "Warrants were issued by me against the Van Dyke Taxi & Transfer Company, Inc., and the Van Dyke International Tours Company, Inc., for violation of section 26 and 25 of the transportation corporation laws based on the testimony taken before me. These corporations violated the law when they maintained bus lines on Bailey Avenue. I could not come to the conclusion that these defendants or Frank X. Schwab had violated section 580, subdivision 1 of the penal code (conspiracy)."

Following the decision the Van Dyke officials announced that no buses would be operated on Bailey Avenue after July 19. They declared that it was their intention to combat the action of the International Railway. The legal value of Mayor Schwab's order will be tested in court soon.

Meanwhile Buffalo citizens and city officials are casting about for some means of relieving the transportation situation brought about by the war between the Van Dyke company and the International Railway.

Frank C. Perkins, commissioner of public affairs, has evolved a plan to put before Council whereby the municipality may operate a bus system of its own. In an opinion sent to the Council, Corporation Counsel Rann holds that the city cannot legally run buses with the exception of lines operating through parks or parkways. Commissioner Perkins suggests that the city designate certain streets as parkways and then run a dozen bus lines to all sec-

tions of the city from a central starting point at the McKinley monument. He is asking the Council to pass a resolution authorizing the holding of a referendum on the question of whether or not the city should appropriate \$1,000,000 to equip municipal bus lines run according to his plan.

## Bus Evolution Features New York's Jubilee Parade

An exhibit which illustrated the evolution of bus transportation from the old horse-drawn stage to the modern motor vehicle was a feature of the Jubilee parade—part of the celebration of Greater New York's twenty-fifth birthday.



Jubilee parade shows development from stage to bus

This entry, presented by the Fifth Avenue Coach Company, won the blue ribbon—the highest award, and attracted more attention than any other portion of the great parade.

First came an ancient horse-drawn stage, the same one which plied up and down Fifth Avenue years ago, and its passengers wore costumes of the '98 period. Behind the old stage were three of the latest type vehicles. The first, "J" Type No. 1010, was filled with kiddies from the Washington Heights Day Nursery. Next came 801, in which were wounded veterans from Seton Hospital, and 809, the closed-in double-decker, had a rollicking, singing group of orphans from the Hebrew Orphan Asylum.

Few entries in the parade received a greater volume of plaudits along the line of march than did the old horse coach. Those who rode in it say the

elder folks who liked the cars, many of whom probably had ridden in that type of vehicle, were particularly loud in their acclamations. The sight took them back twenty-five years and brought up recollections of the time when the avenue was not the hustling, bustling river of humanity that it is today.

Tom Powers, who drove one of the horse vehicles back in '98, was on the driver's seat of the old stage. Commenting on the early days, one of the officials of the company said:

"Looking back to those early years there comes to mind occasions when \$300 was a big day's earnings and pay days when we did not have sufficient funds to meet the payroll. Then to realize the obstacle surmounted, difficulties met and the final achievement of

the present-day successful operation it all leads to this: That as pioneers we may be doubly proud, for history indicates that the majority of pioneers in industry have been failures."

## New Bus Line Started in Rochester

Bus service on Dewey Avenue, Rochester, N. Y., was put into operation on Aug. 1 by the Rochester Railways Co-ordinated Bus Lines Company, Inc., a subsidiary of the New York State Railways.

Installation of a trackless trolley system crosstown over Driving Park Avenue bridge is temporarily delayed pending the approval of the company's application by the Public Service Commission which is expected in the immediate future.

The use of trolley buses has been

strenuously opposed by residents of the territory which will be served by this line, who are insistently demanding the usual motor bus. The City Council,

after an investigation, decided that the trackless trolley would be more economical and better adapted to the needs of the traffic on that route.

## Saginaw to Install New Buses

**Organized Bus Service Expected There Soon—Philadelphia Rapid Transit Company Plans to Start Operation on Sept. 1—Louisville Railway Now Running Buses—Many Other Important Bus Developments**

ARRANGEMENTS are fast being perfected for carrying out the work of rehabilitating the transportation facilities of Saginaw, Mich., under the terms of the new bus-railway franchise approved by the voters at the special election held on June 25. Otto Schupp, the grantee under the franchise, has formally accepted the grant, and plans have been made to sell the local property of the Saginaw-Bay City Railway, for which Mr. Schupp is acting. The date of the sale is Aug. 18. Just as soon as the sale has been approved by the court the property will be assigned to the Saginaw Transportation Company or some other company suitably named, to be organized under the laws of Michigan. The conclusion of the steps just mentioned will, it is hoped, mark the end for Saginaw of a period covering almost two years during which all railway service was suspended and the residents have had to depend upon such transportation service as has been furnished by jitneys.

The new Saginaw franchise gives to Mr. Schupp, trustee, a fifteen-year grant to operate both motor bus lines and electric railway lines, with the privilege of supplying additional motor bus lines or car lines from time to time.

### TEN-CENT CASH FARE

On the type of transportation equipment the ordinance specifies that the equipment shall be standard and first class and that the buses shall seat approximately twenty-five persons. The company must spend \$400,000 within a year.

The rates of fare will be as follows: Regular ticket fare, four for 25 cents; cash fare, 10 cents, and school children's ticket fare, six for 25 cents. These rates of fare are to continue in full force and effect during the entire life of the franchise granted by the ordinance.

Operation of a fleet of buses over the Roosevelt Boulevard in Philadelphia is certain as the result of a series of legislative enactments and appeals to the Public Service Commission. The line will be operated as a part of the system of the Philadelphia Rapid Transit Company. It marks the first attempt at organized bus operation in Philadelphia.

Thomas E. Mitten, chairman of the directors, promises the buses will be running about Sept. 1. He has also promised that other sections of the city will be similarly served as the

company's plans develop. Mr. Mitten and his associates have scoured the country for ideas in bus construction. As the result he and his engineering associates have designed a vehicle they believe is the final word in construction. The designers of the new bus are Ralph T. Senter, vice-president of the transit company, in charge of engineering, and A. E. Hutt, general manager of the Philadelphia Rural Transit Company, the subsidiary under which the motor vehicles will operate.

The initial service will call for the use of ten buses.

There are now three vehicles in operation over the Boulevard. The transit company will purchase this equipment so that the private operators will be reimbursed for losses suffered through the unified bus-trolley service.

The route will be from Broad Street and Erie Avenue to Frankford Avenue and Oxford Street, a distance of 4.8 miles. The fare will be 10 cents with 3 cents additional for transfers to and from the trolley lines. No paving charges are to be exacted from the company, and no other franchise payments will be collected.

The bus line was decided on instead of a trolley service when many automobile owners and residents along the Boulevard objected to the thoroughfare being marred by street cars. The boulevard is essentially a pleasure highway. The 3,500 employees of Sears, Roebuck & Company will benefit by the service.

The subsidiary company of the Philadelphia Rapid Transit Company which will operate the buses is capitalized at \$1,000,000, but for the present only \$100,000 will be paid in. Part of this amount probably will be used to make a cash payment on the ten buses, the rest of the purchase price to be financed through car trust certificates.

With the coming of the bus line the Transit Company expects soon to operate a trackless trolley line on Oregon Avenue, from Eighteenth Street to Delaware Avenue. This is the first attempt at this character of operation in Philadelphia.

Like the bus line the trackless trolley will be operated under a separate incorporation. The fare will be 7 cents cash, with four tickets for 25 cents. Transfers to intersecting trolley lines will be issued free. The fare on the trackless trolley will be the same as that on the local trolley lines.

The Public Service Commission has not yet approved the franchise for

the trackless trolley, but the provisions of that grant are almost identical with those of the bus grant. Part of the delay in connection with the work of concluding the negotiations for the trackless trolley franchise was due to provisions of the state incorporation laws, which were not sufficiently broad to permit the incorporation of trackless trolleys. This was rectified by the State Legislature, which in the closing days of its session passed an amendment clearing up this situation.

In approving the bus line ordinance the commission held that it had no authority to override the expressed wishes of the city as reflected through action by the City Council.

In conclusion the commission said:

"The predominating and determining questions for disposition in the applications before us are those of public necessity and convenience. That the proposed service of the motorbus company under consideration would inure greatly to the convenience and comfort of the public and meet a requirement that indubitably exists, is established beyond peradventure."

Installation of bus service in Louisville, Ky., by the Kentucky Carriers, Inc., a subsidiary of the Louisville Railway, was celebrated recently by fifty-five representative business men of the city who went on an excursion to Speed, Ind., where they met the first arrivals of the new bus fleet.

The six coaches which were met had been driven overland from Cleveland, where they were built. They furnished the means of transportation back to Louisville. The trip up to Speed was made on a special car of the Interstate Public Service Company.

From Washington, D. C., comes the report that the Capital Traction Company was recently granted permits for additional bus lines by the Public Utilities Commission of the District of Columbia. In this connection it is interesting to note that the Washington Railway & Electric Company has declared its willingness to establish a 2-cent transfer agreement between its railway lines and the new motor bus line, thereby giving the public access to all sections of the District of Columbia reached by the railway lines of the two companies.

The new Washington bus line was authorized to charge a fare of 8 cents cash, with six tokens for 40 cents. This is the current rate of fare in force on the railway lines in the District.

In Toledo, Ohio, the plans for improving the city's transportation system includes the operation of bus routes by the Community Traction Company and the barring of all individual and independent operators—making the entire transit system a monopoly under regulation of the City Council. A crosstown bus line is a new feature there. It is estimated that this new crosstown line will require at least thirty buses each capable of carrying at least twenty passengers and operating on an eight-minute

headway. The cost is estimated at \$7,500 to \$8,000 for each bus purchased.

The Steubenville, East Liverpool & Beaver Valley Traction Company has announced that bus service will be established as an auxiliary to its electric railway service in sections of Steubenville, Ohio. Several buses, with a seating capacity of twenty-six, have been put into operation there.

The new bus line between Dilisburg and Dover, Pa., which is to be operated by the York Railways, will begin service before Aug. 15, according to a statement made by Gordon Campbell, president and general manager of the railway. The bus line will make five trips a day, meeting every trolley car from York. At first only one bus will be used in regular service. It will

have a seating capacity of twenty-five persons and will have a carrier in the rear for baggage. The chassis was made by the Pierce Arrow Company.

Bus service in Trenton, N. J., is to be started about Sept. 1, according to an announcement by the Trenton & Mercer Traction Company, which will operate buses on two routes in conjunction with its railway lines in Trenton and vicinity. The buses will be run in the name of the Central Transportation Company, a subsidiary of the electric railway.

The Puget Sound Power & Light Company of Bellingham, Wash., will for the first time use buses as an auxiliary to its car service. Operation there is expected to start soon and will be extended from time to time as local conditions warrant.

## British Bus News Summarized

**Birmingham Bus Lines Issue Novel "One-Day" Tickets—London Bus Operators Organize—Trolley Buses Increasing in Number—Money Value of Britain's Roads in Excess of Railways**

AMONG the facilities now offered by the Birmingham & Midland Omnibus Company is the issue of what are called "anywhere tickets," on Tuesday and Fridays at the price of 6s. This ticket enables a passenger to travel anywhere on any bus belonging to the company at anytime on the day of issue. It is, in fact, a one-day pass over a large section of the Midlands of England.

Colonel Ashley, Parliamentary Secretary to the Ministry of Transport, answering a question in the House of Commons, stated that there were at present eleven railless trolley vehicle systems open for traffic in Great Britain. In addition, in nineteen cases the necessary statutory powers had been obtained but had not yet been exercised, and in two cases routes of that kind had ceased operation.

Since June 1 deliveries of 272 motor buses of the latest N.S. type were made to the London General Omnibus Company and are now in service. At the present time 1,300 vehicles of the same type are on order and the Associated Equipment Company at Walthamstow is working at a pressure which enables it to maintain a weekly output of fifty complete buses. It is anticipated that by the end of March next the fleet will number approximately 4,700 vehicles.

The preliminary steps have been taken for the formation of an association of the owners of small bus undertakings in London. These undertakings are operating in the face of the powerful competition of the London General Omnibus Company and its associated concerns, and the operators want some organization to try to protect their interests. It is only within very recent time that small owners have put motor buses on the streets in the metropolis, but the number of such owners and of their vehicles is gradually increasing.

A progressive substitution of track-

less trolley systems for existing tramway lines appears to be a policy favored by West Hartlepool Town Council. A parliamentary bill promoted by the Council to give authority to work trolley buses in connection with the tramway system of West Hartlepool was recently before a committee of the House of Lords, when it was stated for the promoters that it was proposed to substitute from time to time, as the tramway lines wore out, trackless trolley vehicles. In this way the heavy cost of new tracks would be avoided.

Last year, the buses of the London General Omnibus Company made a fresh record in immunity from breakdown. The number of involuntary stops averaged one in every 3,450 miles. This is an advancement on the previous record of 1921, when one in every 3,200 miles was recorded. This improvement in the running of the "General" buses is largely attributable to the scheme of central overhaul which was introduced last year by the opening of the Chiswick overhaul shops. The time occupied in annual overhaul has been reduced from fourteen days to four days.

Sir Henry Maybury, director general of roads, Ministry of Transport, speaking at a conference of the Urban District Councils Association of England and Wales, said that the value in money to the country of the road system which it had inherited was far in excess of the value of railways. There were something like 240,000 miles of highways dedicated to the public and used for all purposes of traffic. He put their value at a very conservative figure of about £1,000,000,000.

Some interesting points regarding the number of buses in London and the competition between rival fleets were brought out recently by answers given by Mr. Bridgeman, the Home Secretary, to questions in the House of Commons. Mr. Bridgeman stated that there were

14,000 motor buses registered in the London Metropolitan Police District, and that the police authorities were considering the effect of the increase of motor buses on the streets of London. There was no power to limit the number of motor buses, but the police authorities were endeavoring to get the number of motor buses in the London Metropolitan Police District down to 10,000. Mr. Bridgeman said that the police authorities were considering the effect of the increase of motor buses on the streets of London. There was no power to limit the number of motor buses, but the police authorities were endeavoring to get the number of motor buses in the London Metropolitan Police District down to 10,000. Mr. Bridgeman said that the police authorities were considering the effect of the increase of motor buses on the streets of London. There was no power to limit the number of motor buses, but the police authorities were endeavoring to get the number of motor buses in the London Metropolitan Police District down to 10,000.

## County vs. Supreme Court in Schenectady Jitney Regulation

The jitney bus situation in Schenectady, N. Y., has narrowed down to the question of whether a county judge can set aside an injunction order of the State Supreme Court enjoining jitney operators from running automobiles in competition with the electric cars of the Schenectady Railway. The jitney business has grown to large proportions in Schenectady due to the recent trolley strike there, and seems to be growing daily despite court injunctions. At present about 600 jitneys are operating in the city. Since the strike began in May about 1,000 licenses have been issued to jitney operators.

Supreme Court Justice Edward N. Angell, on July 9, issued an order restraining jitney owners from operating in the streets of the city. On July 16 County Judge John J. McMullen, claiming concurrent jurisdiction, issued an order vacating the injunction of the supreme court. This action is said to have created a furore in judicial circles.

It appeared before Supreme Court Justice Bors of the Appellate Division the Schenectady Railway sought to have the order of County Judge John J. McMullen set aside on the ground that "the county judge was without authority to issue such an order."

Justice Bors claims that it is a matter in which Justice Edward M. Angell should have jurisdiction because he was the judge who issued the original injunction.

From the course the argument took the legality of the vacating order seemed to hinge largely upon whether the vacating order was that of the County Court or of the county judge.

Judge Naylor, who appeared for the railway company, contended that it was a County Court order and as such was improperly issued in that the County Court was without jurisdiction.

A hearing before the Appellate Division is set for Aug. 4. Meanwhile the jitneys continue to operate in Schenectady with renewed vigor.

Some indications of the income of jitney owners during and since the trolley strike may be derived from the fact that the gross earnings of the Schenectady Railway in June, 1923, amounted to \$5,457 against a gross of \$136,769 in June, 1922.

### Pay Increase and Annual Vacations for Fifth Avenue Coach Employees

Substantial wage increases and annual vacations with pay for all employees were announced by the Fifth Avenue Coach Company, New York, on June 29. Frederick T. Wood, president and general manager of the company, in announcing the new policy, said that the vacation system had been established in recognition of the valuable service the men and women of the company are extending to the bus traveling public of the city of New York.

The new wage rates became effective July 1, 1923. The pay of drivers and conductors, in cents per hour, was increased to the scale shown in the accompanying table.

### Old and New Wage Scale, Fifth Avenue Coach Bus

DRIVERS		
Year	Present Rate per Hour	New Rate per Hour
First .....	\$0.65	\$0.69
Second .....	.66	.70
Third .....	.69	.73
Fourth .....	.70	.74
Fifth and thereafter .....	.71	.75

CONDUCTORS		
Year	Present Rate per Hour	New Rate per Hour
First .....	\$0.58	\$0.62
Second .....	.59	.63
Third .....	.62	.66
Fourth .....	.63	.67
Fifth and thereafter .....	.64	.68

The dispatchers, supervisors and other men in the transportation divisions also received increases in pay. The details of these advances, however, were not included in the official statement.

With respect to vacations, the statement said:

"Hereafter, every person who has been in the service of the company for one year or longer will be eligible to receive a vacation of one week each year with full pay at his regular rate, providing he has worked regularly and efficiently during the preceding year."

## Tabular Presentation of Recent Bus Developments

Company	Lines Started	Address	Route
Logan Valley Bus Co.	Altoona, Pa.	Altoona, Pa., and vicinity	
Representative Bus Co.	Cleveland, Ohio	Cleveland, O., and vicinity	
Chifford B. Elin	Morrisville, Pa.	Morrisville, Pa., to Trenton, N. J.	
New York & Montreal Motor Line Co.	Montreal, Canada	Montreal, Can., to New York, N. Y.	
New York & Montreal Motor Line Co.	Montreal, Canada	Montreal to Quebec, Canada	
Gopher Bus Co.	Duluth, Minn.	Topeka to Kansas City, Kas.	
Ingalls Bus Lines, Inc.	Cuba, N. Y.	Orlean to Fillmore, N. Y.	
Price & Burnside Co.	Martins Ferry, Ohio	Bellaire to St. Clairsville, Ohio	
C. W. Scott	Rushville, N. Y.	Naples to Canandaigua, N. Y.	
Kenilworth Transportation Co.	Asheville, N. C.	Asheville and Charlotte, N. C.	
Beaver Valley Traction Co.	Pittsburg, Pa.	Beaver to Vannort, Pa.	
Pacific Electric Railway	San Pasadena, Cal.	S. Pasadena to Monterey Park, Cal.	
Royal Green Coach Co.	Hamilton, Ohio	Dayton to Hamilton, Ohio	
Mark Smith Motor Bus Lines	Elgin, Ill.	Elgin to Crystal Lake, Ill.	
Blackhawk Motor Bus Lines	Rockford, Ill.	Rockford to Dixon, Ill.	
Brunswick Motor Co.	New Brunswick, N. J.	New Brunswick to Freehold, N. J.	
Steuenville, East Liverpool & Beaver Valley Traction Co.	East Liverpool, Ohio	Steuenville, Ohio, and vicinity	
Pennsylvania-Ohio Coach Lines Co.	Youngstown, Ohio	Mahoningtown, Ohio	
C. H. Caler	Hannibal, Mo.	Hannibal to Pahrmyra, Mo.	
Casco Bay Bus Lines	Portland, Me.	Portland to New Meadows, Me.	
Rochester Railway Co-ordinated Bus Lines, Inc.	Rochester, N. Y.	Extension routes in Rochester, N. Y.	
Trackless Transit Co.	Bloomfield, N. J.	East Orange to Belleville, N. J.	
Banker & Son	New Brunswick, N. J.	New Brunswick to Asbury Park, N. J.	
Independent Bus Line	Memphis, Tenn.	Memphis, Tenn., and suburbs	
White Star Line	Portland, Me.	Portland to Old Orchard, Me.	
Urban Taxi Co.	Gallatin, Tenn.	Gallatin to Red Boiling Springs, Tenn.	
Beckhask & Berot	Salamanca, N. Y.	Salamanca to Allegany Park, N. Y.	
Pelott Motor Bus Line	Beloit, Wis.	Beloit to Monroe, Wis.	
Pennett Auto Livery Co.	Nashville, Tenn.	Nashville to Horn Springs, Tenn.	
C. A. Victory Transit Co.	Joplin, Mo.	Joplin to Baxter, Mo.	
Public Service Ry.	Newark, N. J.	Camden, N. J., Kaighn Ave.	
Louisville Ry.	Louisville, Ky.	Louisville Streets	

Company	Address	Route
Hudson Transit Corporation	Port Jervis, N. Y.	Port Jervis to Middletown, N. Y.
George Reim	Tharptown, Pa.	Tharptown and vicinity
Berlin Bus Co.	Camden, N. J.	Camden to Waterford, N. J.
Franklin G. Greenfield	Atlantic City, N. J.	Atlantic City to Cape May, N. J.
Charles W. Mastin	Camden, N. J.	Camden to Audubon, N. J.
Maidville Bus Co.	Morgantown, W. Va.	Morgantown to Mt. Morris, W. Va.
Motor Transport Co.	Grand Junction, Colo.	Grand Junction to Paonia, Colo.
C. G. Abernathy	Hornell, N. Y.	Hornell to Rochester, N. Y.
Howard J. Spencer	Salt Lake City, Utah	Salt Lake City to Pinerest, Utah
Frank S. Jones	Canandaigua, N. Y.	Canandaigua to Penn Yan, N. Y.
Richmond Transit Corporation	Richmond, Va.	Richmond to Shiloh's Lake, Va.
Brent Bowman	Harrisonburg, Va.	Staunton to Harrisonburg, Va.
Colorado Motor Ways Co.	Denver, Colo.	Denver, Colo. and vicinity
J. M. Dickerson Bus Line	Washington, D. C.	Washington, D. C. to Alexandria, Va.
Georgetown-Clarendon-Ballston Bus Line	Georgetown, Va.	Georgetown to Ballston, Va.
Walden-Walkill Bus Line	Walden, N. Y.	Walden to Walkill, N. Y.
Herbert M. Park	Rome, N. Y.	Rome to Camden, N. Y.
Richards & Westhoff	Franklin, N. J.	Sussex to Newton, N. J.
Amie Needleman	Elizabeth, N. J.	First Street, Elizabeth, N. J.
Anthony Russe	Camden, N. J.	Camden to Merchantville, N. J.
Suburban Rapid Transit Co.	Camden, N. J.	Camden to Westmont
W. V. R. Saltzer	Ephrata, Pa.	Ephrata to Elversburg, Pa.
Lloyd H. Hudson Motor Vehicle Line	Clifford, Va.	Lynchburg to Clifford, Va.
White Star Bus Line	Portsmouth, Va.	Norfolk to Suffolk, Va.
Reo Speed Line	Richmond, Va.	Richmond to Farnville, Va.
Red Bus Line	Madison Heights, Va.	Lynchburg to Forest, Va.
Gold Star Transportation Co.	Damascus, Va.	Damascus and Glade Springs, Va.
Royal Blue Transportation Co.	Greensboro, N. C.	Danville to Greensboro, N. C.
Taylor Bros	Chilhowie, Va.	Konmark to Bristol, Va.
Blackstone-Kenbridge Bus Line	Kenbridge, Va.	Victoria to Blackstone, Va.
Dante-Bristol Service Line	Castlewood, Va.	Bristol to Dante, Va.
John L. Fisher & Son	Waynesboro, Va.	Staunton to Basic, Va.
De Camp Bus Lines	Newark, N. J.	Newark to Morristown, N. J.
Simpson Motor Bus Co.	Carrollton, Ill.	Carrollton to Kampsville, Ill.
Eastern Massachusetts Railway Co.	Boston, Mass.	Wakefield to N. Saugus, Mass.
Harold E. Hennous	Erie, Pa.	Erie to Corry, Pa.
Elmer I. Shirley	Boswell, Pa.	Boswell to Jennertown, Pa.
W. P. Wolcott	Rimersburg, Pa.	Rimersburg to Chieora, Pa.
C. L. Reese	East Brady, Pa.	East Brady, Pa. and vicinity
Rockford City Traction Co.	Rockford, Ill.	Rockford, Ill., and vicinity
Byrum & McCoy	Turtle Creek, Pa.	Turtle Creek to Renton, Pa.
James G. Grossman	Greensburg, Pa.	Greensburg, Pa., and vicinity
I. Eugene Goodside	Pittsburg, Pa.	Pittsburg, Pa., and vicinity
Mahoning Auto Co.	New Castle, Pa.	New Castle to Bessemer, Pa.
Trenton & Mercer County Traction Corp.	Trenton, N. J.	Trenton, N. J., and vicinity

Incorporations	
Skinner & Green Transportation Co.	Lexington, Ky.
Fairpoint-St. Clairsville Bus Co.	St. Clairsville, Ohio
Red Star Transportation Co.	Zanesville, Ohio
Mackay Bus Corporation	Portland, Maine
Parmenter Motor Bus Co.	Westville, Ill.
Herzog Motor Bus Transportation Co.	Edwardsville, Ill.
Reliable Motor Bus Co.	Peoria, Ill.
New England Bus Lines, Inc.	Holden, Mass.
Bellaire-Neff Bus Co., Inc.	Bellaire, Ohio
Pellemeier, Inc.	Richmond Borough, New York City
125th St. & Grand Concourse Garage Co.	New York
Royal Green Coach Co.	Dayton, Ohio
Pennsylvania Rapid Transit Co.	Philadelphia, Pa.
Aldrich Bus Lines, Inc.	Norwich, N. Y.
Dubbe Bee Holding Co., Inc.	645 Tremont Ave., Bronx, N. Y.
Western Ohio Bus Co.	Lima, Ohio
Main Street Bus Owners Association	Patterson, N. J.
Inter-Urban Motor Bus Line, Inc.	Newark, N. J.
United Bus Transportation Co.	Newark, N. J.



## Financial Section

### Washington Rapid Transit Asks Ten-Cent Bus Fare

Application for a 10-cent fare on all its bus lines was filed with the Public Utilities Commission of the District of Columbia recently by the Washington Rapid Transit Company, operating buses in the city of Washington and vicinity. The present fare is 8 cents.

The company declares that its present rate of fare is "entirely inadequate to enable it to render the kind of service it wants to give to Washington."

"It is the desire of the company," reads the petition presented to the Public Utilities Commission, "to place itself in a financial position where it can give the kind of service which Washington deserves by substituting, from time to time, the most improved type of motors and motor buses and increasing in every way possible the efficiency of its service. This is impossible unless the return on the invested capital from time to time is sufficient to meet the proper and necessary overhead and operating expenses of the company, the creation of a sufficient depreciation reserve, the amortization of its legitimate expenses of organization and financing, the creation of a fund for working capital and payment of a fair and reasonable return on its investment."

The petition then goes on to state that the present rate of fare authorized by the commission is entirely inadequate for the above purposes. The company believes that an increase to 10 cents per passenger would enable it to accomplish the ends in view, and therefore prays that such increase may be authorized by the commission.

"In connection with this request," states the petition, "the attention of the commission is directed to the fact that in all pioneer enterprises of a public utility nature in which risk of loss is attendant upon the inception of the enterprise, a higher return than that allowed a long and safely established public utility is not only justified but is necessary in order that the capital essential to the enterprise may be enlisted, and experience has demonstrated that this higher rate is ultimately as much in the interest of the public as of the company."

The application sets forth that the administrative officers of the company have received practically no salary since operations were begun. The company estimates that it should be allowed a working capital fund of \$25,000.

The financial statement of the company for 1922 as contained in the report of the Public Utilities Commission of the District of Columbia is given in the accompanying table. In consider-

ing these figures it must be borne in mind that the Washington Rapid Transit Company started operation in March, 1921. The figures for that year, therefore, represent only ten months of actual operation, in a period of uncertainty and comparatively slow development.

### Washington Rapid Transit Co. Financial Statement

	1922	1921
<b>Income</b>		
Operating revenue:		
Revenue from 8-cent fares collected	\$282,728	\$113,284
Revenue from advertising	3,014	2,675
Total operating revenue	\$285,742	\$115,959
Operating expenses:		
Depreciation	\$80,506	\$34,445
Chassis and wages	6,909	2,350
Stations, wages	47,197	15,669
Gasoline	5,299	889
Laboratory	20,266	8,861
Trucks		
Total vehicle operating	\$159,177	\$62,109
Garage operating		
Salaries	\$103	
Salaries, garage superintendent	1,506	\$1,130
Wages	4,632	1,770
Light and electricity	997	219
Supplies	1,509	314
Total garage operating	\$8,750	\$3,438
Maintenance:		
Body repairs, labor	\$974	\$399
Body repairs, material	1,186	417
Chassis repairs, labor	10,224	5,098
Chassis repairs, material	13,465	2,281
Miscellaneous maintenance	252	149
Total maintenance	\$26,098	\$8,344
Depreciation:		
Bodies	\$18,006	\$6,378
Chassis	22,320	9,178
Batteries	900	614
General equipment	668	270
Garage equipment	535	
Miscellaneous equipment	412	63
Total depreciation	\$42,841	\$16,503
General and miscellaneous expenses:		
Salaries of officers	\$5,107	\$7,499
Salaries, general office clerks	5,603	3,648
General office supplies and expenses	3,817	2,725
Law expenses	1,741	1,433
Insurance	15,158	6,020
Rent of building	5,770	3,233
Utilities	540	211
License	1,277	1,603
Advertising	8	129
Free riding	1,941	1,408
Miscellaneous general expenses		
Total, general and miscellaneous expenses	\$40,932	\$27,909
Total operating expenses	\$276,799	\$118,403
Nonoperating revenue:		
Discounts earned	8,973	367
Miscellaneous nonoperating revenue	341	
Total nonoperating revenue	\$9,314	
Gross income	\$9,698	
Deductions from gross income:		
Interest on funded debt	1,944	2,209
Taxes	1,667	684
Other deductions from gross income	252	120
Total deductions from gross income	\$3,863	
Net corporate income	\$5,835	
Traffic statistics:		
Passengers carried at 8-cent fare in 1922	3,535,206	
Employees and others carried free	168	
Total passengers carried	3,535,374	
Transfer passengers carried	57,227	
Passengers carried per bus-mile	2.36	
Revenue from transportation per bus-mile (cents)	19.01	
Operating expenses per bus-mile (cents)	18.48	
Buses run during year ended Dec. 31, 1922	149,718	
Motor buses in use Dec. 31, 1922	36	

### Federal Tax on Privately Operated School Buses

Internal revenue officers at Iowa have made a decision on the status of school buses with respect to their tax status and are collecting taxes on the United States from the operators for the years 1921, 1922, and 1923. The tax is \$10 a year for buses carrying from two to seven passengers, \$20 for buses having capacity for more than seven. The \$20 rate applies to a school bus. Where the capacity of the vehicle is the tax is \$10 a year.

Where school buses are operated by the state or other public authority, such as a school district, the tax is levied. In cases where the buses are operated for private individuals, the tax is levied on the individuals. The tax is levied on those buses which are used for commercial purposes. In the case of a school bus with a capacity of more than two and carrying more than seven passengers, the tax is \$20 a year with a capacity greater than that of passengers. The tax is levied on a monthly basis.

### Depreciation on Buses 18 1/2 Per Cent Yearly

Yearly depreciation of buses operated in Oregon by the Columbia Stage Line was placed at 18 1/2 per cent during a hearing before the Public Service Commission of that state recently. The company operates along the Columbia River from Astoria through Portland, and up the river to the Dalles.

To show the rate of depreciation on a typical passenger stage line in Oregon, the commission's technical staff made a careful investigation as to the cost, useful life and salvage value of the sixteen cars operated by this company. The cars were equipped to carry twelve and fourteen passengers. During the early period of their service they had been operated over comparatively rough and unimproved roads, though at the time the survey was made the route had been paved.

The original cost of the sixteen cars was \$81,650. They were operated for various lengths of time and were sold or traded in on new equipment for \$23,350. The average term of service for all cars was 3.85 years. Using this as the average life in service, the average yearly depreciation on the cars was found to be \$15,143 and hence the yearly rate of depreciation, based on the original cost, was 18 1/2 per cent.

These results were not considered as in any way determining what the rate of depreciation is on other lines, and the commission was careful to point out that at the time the survey was made the line in question was operating under unusually favorable circumstances due to good road conditions and the partial standardization of equipment. On the other hand, some cars discontinued were in roadworthy condition, but were abandoned to complete standardization on a single make of vehicle.

### Fifth Avenue Coach Earnings Increase

Current earnings of Fifth Avenue Coach Company, New York City, are running considerably ahead of last year. Gross revenue for ten months ended April 30, 1922, amounted to \$4,555,380 compared with \$4,271,331 in the corresponding period of the preceding year. During the ten months 44,630,097 revenue passengers were carried. This is an increase of 2,740,924 over the similar period in the previous year.

A comparative statement of earnings of the Fifth Avenue Coach Company for April, and for ten months ending April 30, 1922, and 1923 is as follows:

	1923	1922	Increase
April gross revenue	\$508,460	\$499,577	\$8,883
Net revenue after taxes	130,788	125,393	5,395
Net corporation income	141,283	133,719	7,564
Ten mos. gross income	4,555,380	4,271,331	284,049
Net after taxes	960,730	770,501	190,229
Net corporation income	1,064,138	850,934	213,203

### Feeders for Traction Lines Show \$16,308 Deficit for Year

Operation of motor buses as feeders to the railway system of the Washington Railway & Electric Company, Washington, D. C., resulted in a loss of \$16,308.65 for the year 1922. This is indicated by the financial statement of the company given out recently. Passenger revenue and operating expenses from May, 1922, to May, 1923, appear in the accompanying table.

#### Bus Revenue and Operating Expenses, Washington Railway & Electric Company

		Passenger Revenue:		
8-cent cash	133,664	\$10,695		
6 1/2 cent tokens	430,625	28,708		
2-cent transfers	279,248	5,777		
75-cent Maryland tickets	1,961	147		
35-cent commutation tickets	973	35		
			\$45,362	
Operating expenses:				
Chauffeurs wages	19,118			
Starters and inspectors wages	193			
Gasoline	8,398			
Lubricants	1,068			
Tires	5,179			
Wages (garage)	5,759			
Light, heat, power and water (garage)	271			
Garage supplies	1,466			
Body repairs—labor	949			
Body repairs—materials	796			
Chassis repairs—labor	1,964			
Chassis repairs—materials	1,548			
Depreciation	10,260			
Insurance	126			
Injuries and damages	1,973			
Licenses	117			
Advertising	5			
Miscellaneous general expenses	352			
Total	59,542			
District of Columbia franchise tax	1,893			
All other taxes	235			
			\$1,670	
Net deficit				\$16,308

Due to the joint operation with the Capital Traction Company of the Woodley Road bus line, the entire loss is not borne by the Washington Railway & Electric Company.

During the period covered by the financial statement, the buses carried 55,140 free transfer passengers in addition to those using the 2-cent transfer and operated 308,406 bus-miles.

## Bus Regulation



### Operating Code Discussed

State Officials Confer With Bus Men Over Proposed Regulations Under New Ohio Law—Outline of Provisions Adopted

MOTOR BUS, steam railway, commercial trucking and street railway men convened with the Ohio Public Utilities Commission at Columbus on July 11 and 12, to discuss proposed regulations to be imposed by the commission under the Freeman-Collister bus bill, which became effective on July 27. Representatives of the various transportation systems had been invited to submit proposals for regulations.

None of the decisions reached at the meeting is final, the commission reserving the right finally to approve a set of regulations after the Freeman-Collister bill is in effect.

Safety measures were discussed at great length. It was agreed that buses should come to a full stop before proceeding to cross a railroad in the city limits and in the country. The matter of stopping at interurban crossings was left to the utilities commission to decide with the suggestion that the commission, in making out the certificates of convenience for bus lines, specify all such stops on the route to be traversed by the buses. It was also agreed that buses should pass crossings in second speed.

The regulations were assembled by John Harold, head of the motor transportation department of the commission, and were approved by Judge E. E. Corn, attorney for the commission. There are about eighty regulations in all, mostly of a minor regulatory nature. Mr. Harold will be in direct charge of the enforcement of the rules. He told the bus men that the first rule definitely decided on by the commission, and one that it will insist be strictly enforced, is that schedules be adhered to faithfully. Buses must not leave their stations before schedule time, even if they are filled some time before, he said, and regular trips must be made.

Another ruling that the commission insists on establishing is that when a bus breaks down on the road, passengers must be transferred to the first bus which passes bound in the same direction, whether it be a bus operated by the same company, or one operated by a competitor. In a case of this kind the compensation will be prorated.

Under the Freeman-Collister bill reviewed at length previously in BUS TRANSPORTATION, all inter-city and local bus lines and commercial trucking companies doing inter-city hauling are compelled to take out licenses with the commission and post bonds. There is an insurance clause in the new law also.

The license fees range from \$40 to \$240, graduated according to the capacity of the buses. The amounts of the bonds will be fixed by the commission later.

Bus lines and trucking companies in business in the State prior to April 28, the date the bill was filed with the Secretary of State, were issued certificates of convenience without hearings, except where protests had been filed.

### Regulatory Act Passed in Milwaukee

The City Council of Milwaukee, Wis., recently passed an ordinance providing for the regulation of bus lines by the granting of licenses to companies contemplating operation.

No franchise or permit for any line was issued, however, and consideration of the applications of the Milwaukee Electric Railway & Light Company, the Milwaukee & Suburban Motor Coach Company, and the Wisconsin Motor Coach Company for exclusive permits to operate on the most desirable routes, will not be renewed until the Council meets in September. In the meantime the electric railway buses are left in possession of the route over which they are now operating.

The recent ordinance passed by the Council declares that operation of any motor vehicle upon Milwaukee streets affording passenger transportation similar to that afforded by street railways shall be illegal unless consent of the Common Council for such operation is procured through a license. Application for such a license must be made to the Common Council and it must contain full information as to the person or corporation, the name, type and make of each vehicle to be used; seating capacity, route or territory to be covered, hours of operation and rate of fare to be charged. The issuance or denial of such license shall be decided by majority vote of the Common Council. After a license is obtained additional vehicles may be put in operation by the licensee over the same route without a new application. Licenses shall expire July 1 of each year. Provision is made that the granting of a license shall not be construed as granting an exclusive use or right to operate over any designated route or territory. As a reasonable compensation for the maintenance of bridges and pavements, regulation of traffic, etc., the following schedule of license fees is fixed:

For each vehicle with a capacity of four passengers or less, \$5 a year; more than four or less than ten passengers, \$10 a year; more than nine and less than twenty passengers, \$100 a year; more than nineteen and less than thirty passengers, \$125 a year; more than twenty-nine passengers, \$150 a year.

If the route of any vehicle extends beyond Milwaukee County only 25 per cent of the fee shall be charged.

An amendment adopted limits the operation of single-deck buses with pneumatic tires to the hours between



7:30 a. m. Sundays and 6:40 a. m. week days, and midnight; and for double-deck, solid tire buses to hours between 8:30 a. m. Sundays and 7:40 a. m. week days and 10:30 p. m.; buses can operate only one way on a street 30 ft. or less in width.

## Injunction Ready to Serve

## New York City Bus Lines Will Be Stopped if Governor Heeds Mayor's Plea

**O**PERATION of buses in New York, under the supervision of the city may be stopped by injunction at any time. This was the way matters stood on Aug. 2. Attorney Marshall, acting for a taxpayer, actually has in his possession the key to the situation. Some time ago Supreme Court Justice Mullan granted to Mr. Marshall's client an injunction order, but the serving of this was put off pending appeal by the city to the Court of Appeals through a stay of execution secured by the Corporation Counsel. That body on July 14 denied the request of the city.

There are twenty-eight municipally-supervised bus lines in New York City, and it is said that last year they carried more than 80,000,000 passengers. It was expected that the injunction would be served at once, but Mr. Marshall has withheld action to that end. His hope is that the Mayor will listen to reason. As it is now, money of the taxpayers is being used by the city to provide men for supervising the present bus lines. It is to this expenditure that Mr. Marshall's client objects. Mr. Marshall says that he will be satisfied if the Board of Estimate shall grant franchises to bus operators as was done in the case of the Concourse Bus Line. The Mayor professes to see in this merely a scheme of the local traction companies eventually to secure such grants. As for the Transit Commission it stands ready and willing to approve certificates of convenience and necessity where in its judgment the conditions warrant.

With the Mayor seeing the whole move as a plot, he called a special meeting of the Board of Estimate for July 16 at which he urged the board to appoint a committee to request the Governor to call an extra session of the Legislature to push through a program of transit legislation for the city similar to the one which failed at the recent session. The Mayor said:

"It is not the intention of the Board of Estimate to continue indefinitely this private operation of buses, but to do so only until such time as the courts decide as to the city's right to purchase and operate buses or the Legislature empowers the Estimate Board to install a proper city-owned and city-operated bus system."

The Mayor had his way in the board. As a result a delegation headed by him went to Albany on July 16 and appealed to the Governor to call the Legislature in special session. The transit situations in Buffalo and Schenectady grow-

out of the railway. Take two more related in similar appeals from these cities for the right to operate lines. The Governor took all of the appeals under consideration.

As indicated previously, Mr. Marshall has said that it is his hope the city will proceed to provide for the legalized operation of the beer tender franchise from the city and with certification from the Board of Estimate, but that in the event of the calling of a special session of the Legislature he will act as attorney to serve the restricted liquor which he has obtained from the court.

The original move by Mr. Marshall in behalf of Mr. Schafer was taken last summer. On Oct. 4 an injunction was issued restraining the city officials from using city funds in connection with bus operation. Justice Mullan, who granted the injunction, held that the city must be enjoined from "appropriating municipal funds for the purchase and operation of municipal motor buses and from operating or assisting in or supervising the operation of privately-owned buses that are now being operated without franchises but with official sanction." On the plea from the Corporation Council the court on Oct. 16 issued a stay against the enforcement of the provisions of the injunction which continued in effect pending appeal.

In connection with the matter a new angle of surprising importance affecting municipal operation of buses in New York State has developed at Albany. It seems that the Legislature of 1923 passed for the second time an amendment to article twelve of the New York State constitution (the so-called home-rule for cities amendment), and that this amendment will be voted on by the people at the November election.

If it goes through, the only kind of a law the Legislature could pass on the subject would be a law that would allow each city in the State to own and operate bus lines; the law would authorize not only the city of New York with a population of more than 5,000,000, the city of Buffalo with a population of 500,000 to operate bus lines, but would for instance confer like jurisdiction upon the city of Sherill in Oneida County which has a population of 1,761, and a goodly number of the smaller up-state cities are not enthusiastic about having such a problem thrust upon them.

The logical conclusion is if New York City is to be given the right to own and operate bus lines, it must be done by the present Legislature before the November election. Whether the up-state members of the Legislature would give to New York City the legislation in extraordinary session it denied to them at its regular term is entirely problematical, but unless an extra session is called, and if the proposed constitutional amendment prevails, the city of New York will never be able to get a special municipal ownership act on the statute books except by the vote of two-thirds of the legislature.

## Book Reviews



## What, When and Where for the Motorist

"I know, of course, that the Government requires of the press a certain amount of self-censorship, but I am not prepared to submit before the Government a document that will be expected to be read by a great annual lot of the intelligent people of the Empire, at least many of them, and the improper, at least many, would be the normal, operation of a free press. I will disseminate the information necessary for the achievement of the Government's purpose of this Bill."

The author then proceeds to give the applicant a list of the law books to get. First he tells what the owner must do to comply with the law of registration regarding operation of automobiles. Then he gives qualifications and duties of chauffeurs, and the legal responsibilities of garage owners.

A well-wounded article sets forth the duties and rights of pedestrians, while other sections deal with manufacturers, dealers, and laws of the highway.

Omnibus laws, courts and 111 jail officers exercising jurisdiction in towns and villages, sustenance, recreation and reissuance of tickets, and some well-defined "Don'ts for Motorist" are also a feature of this valuable little volume. Mr. Wenzel has, in fact, translated the motor vehicle law into readily understandable language.

## Highway Research Projects

This bulletin is prepared primarily for research workers who desire to be informed about progress in airway engineering and highway transportation research, either under way or recently completed. The items are arranged under headings such as Economic Operation, and Road Design. Under each of these are many references to the various research projects; these are arranged according to states. A brief note is given showing who is handling the work and just what is being done. Most of the material seems to relate to highway investigations. The information on developments relating to the design of vehicles as related to the road has been omitted, it is sad, because that field is being studied by the Society of Automotive Engineers.

# Personal Notes

## Ralph L. Jacobs Makes a Record

Transportation Superintendent of Traction Company Bus Lines Knows His Job—Applied Novel Ideas

**R**ALPH L. JACOBS has been appointed superintendent of transportation of the Dayton & Columbus Transportation Company and the Columbus & Zanesville Transportation Company, the two bus companies operated in co-ordination with the lines of the Indiana, Columbus & Eastern Traction



Photo by Baumgardner

R. L. Jacobs

Company. Mr. Jacobs entered the transportation field in April, 1910, as a motorman on the Lima city lines of the former Ohio Electric system. After three months of service on the city lines, he was transferred to the interurban service in which he remained as a motorman until November, 1915, when he became a dispatcher in Lima.

While in the train dispatchers' office at Lima, Mr. Jacobs started the operation of a fleet of freight trucks in local service, and it was due very largely to his experience in operating this freight truck line that he was selected as superintendent of the traction company bus lines when this service was started.

In October, 1921, Mr. Jacobs was transferred from Lima to Springfield where he continued to dispatch trains up to the first of this year, when the traction company decided to enter the bus field, not only as a matter of self-protection against outside bus competition, but also because it was believed that the co-ordinated traction-bus service would prove a profitable venture.

With the organization of the two motor bus lines by the traction company Mr. Jacobs was told "to go to it."

And he is "going to it." While he regards bus operation as being a permanent part of the transportation system of the future, he views the system at present as in the experimental stage. Close survey is kept by his office on the operation of the fleets of the two companies with a view to improvement of service and the institution of economies so as to reduce overhead and consequently increase the profits.

The two companies at present have twenty-one seven-passenger Studebaker touring cars in operation on routes parallel to lines of the traction company. Two additional eighteen-passenger buses are being used in the Zanesville city service, while another twenty-two passenger bus is being used between Columbus and Grove City, Ohio, the latter route being abandoned by traction service some months ago.

### RESERVED SEATS A FEATURE

One of the novel ideas adopted by the bus lines under the supervision of Mr. Jacobs was the adoption of the "reserve seat" plan for the motor cars. Traction car and bus tickets on the two lines are not interchangeable, although both use the same stations; the tractions generally departing on the hour from the terminals, and the buses on the half hour. Those desiring to use the bus lines request a "motor ticket" which bears a seat number. The buses are only "sold" to their seating capacity, thus assuring every passenger a seat. Another feature of the plan provides that a person contemplating a trip may telephone the station and have a seat on a bus reserved for him.

But behind the whole project, with his fingers constantly on the pulse of the operations to keep things moving smoothly and surely, is Ralph L. Jacobs, who in the brief time that the service has been in operation, has gained the respect and admiration of his co-workers in the traction company.

### Prince of Wales Honors Transport Institute

At the dinner of the Institute of Transport, held at the Savoy Hotel, London, recently it was announced that for the coming year his Royal Highness, the Prince of Wales, K. G., K. T., had agreed to become honorary president of the institute. In this position he succeeds the Right Hon. Lord Ashfield, chairman of the board of the London General Omnibus Company.

The president of the institute, Sir Sam Fay, in making this announcement, said that the institute was in its infancy and in his opinion must assuredly grow with the heir to the throne as its honorary president.

## Jersey City's Supervisor

Joseph E. Colford Heads Bureau of Motor Bus Transportation—He Is Making the Buses Dependable

**T**HE Motor Bus Transportation Bureau of Jersey City, N. J., under the direction of Joseph E. Colford, is making remarkable progress in the co-ordination and supervision of the motor bus lines of the city, and because of its efficiency and apparent sincerity is rapidly gaining the confidence of the public and the enthusiastic support of the bus operators.

Mr. Colford took charge of the bureau in September, 1922. He set to work at once to build up a system of bus lines noted for their speed, safety and dependability. Under his regime the popularity of the bus as a means of transportation has increased greatly.

There are more than 200 buses operating in Jersey City at the present time. A city ordinance regulates sched-



J. E. Colford

ules, establishing a maximum headway of four minutes for day operation—two minutes during rush hours. The bureau sees to it that these schedules are maintained.

### SUPERVISOR SINCE SEPT. 1, 1922

Specifications for buses are regulated by the city and all buses are equipped with the latest devices to insure safety, speed and comfort. The personnel of the bureau includes several inspectors who are on the job day and night seeking to prevent violations of the city ordinances and to enforce the maintenance of bus schedules. Every bus in operation must be driven to the City Hall once a month for mechanical inspection. A tax of 5 per cent on gross receipts is levied by the city. This levy amounts at the present time to about \$7,000 a month. The revenue of the city from this source has increased more than 50 per cent since Mr. Colford became director of the bureau.

Mr. Colford was born in Newark, N. J., on May 26, 1883. He was educated in the Public Schools of Jersey City. In 1908 he was appointed to the position of clerk in the city collector's

August, 1923

office and was later appointed Tax Assessor in the Tax Department at Jersey City.

His entrance upon the work of the position as supervisor of the Jersey City Bus Transportation Bureau dates from Sept. 19, 1922, when he was appointed assistant deputy director of revenue and finance. The duties of this office include the direction of the bus transportation bureau.

#### BUS SERVICE MUST BE DEPENDABLE

Mr. Colford believes in the future of the bus business. He believes that the confidence of the public must be gained in order to insure permanent success. He believes further that if the drivers of buses will treat their passengers with courtesy and bend every effort to maintain dependable schedules, bus transportation, now in its infancy, can be developed into one of the most important means of transportation.

#### M. H. Newton, Cleveland Advertising Manager

M. H. NEWTON, formerly advertising manager of the White Company, Cleveland, has been appointed advertising manager, Cleveland territory, for BUS TRANSPORTATION. Mr. Newton is an old newspaper man, having been a reporter and special writer for the *Brooklyn Eagle* from 1900 to 1909. During the last year of this connection he was automobile editor of that paper.

From 1910 to 1912 he was publicity manager of the United States Motor Company, which embraced Maxwell, Columbia, Stoddard-Dayton, Brush Runabout, and Sampson trucks. At the same time he was acting as automobile editor of the *New York Press*.

In December, 1912, he went with the White Company, Cleveland, as a copy writer. In 1915 he became assistant advertising manager, and then in 1917 was appointed advertising manager. Mr. Newton is a member of the Cleveland Advertising Club and the Advertising Club of New York and the Society of Automotive Engineers, a national body with its main office in New York City.

Mr. Newton's wide experience, and his knowledge of the entire automobile industry will be of the greatest value in his new work. He began service with the McGraw-Hill Company on July 1.

## Obituary

Fred A. Haas of Watertown, N. Y., part owner of the Watertown-Alexandria Bay Bus Line (Haas & Larabee), died recently as the result of a shock. Mr. Haas was born in Alexandria Bay and has lived in that village until two years ago when the Watertown-Alexandria Bay Bus Line was placed in operation.

# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



## Bus Orders Diversified

Study of Recent Purchases Shows Number of Users Increasing and Wider Appreciation of Vehicle's Mobility.

ORDERS for buses placed during the first six months of the present year by electric railways afford striking evidence of the spread of the idea of the use of the bus among the railways. Not since last September, when BUS TRANSPORTATION published a detailed study of this matter, have figures been published compiled from official sources, but additional evidence is provided by even a casual study of the record of orders for buses placed recently as reported in BUS TRANSPORTATION.

Among the outstanding recent orders for buses by the railway is the one at Los Angeles for eighty vehicles. Next in importance perhaps in point of size is the Washington order for twenty vehicles. From these the orders trail down to purchases of only a single vehicle. The average of purchases of buses by the railways exclusive of the Los Angeles order is 6 per company, with the highest order twenty and the smallest one. Figures of percentages increase in purchases do not tell the story. In the absence of a carefully prepared tabulation of vehicles in service such as was made in BUS TRANSPORTATION last September, it would appear that the orders for buses placed by the railways for the full year 1923 will be greatly in excess of those ordered last year. The tendency of orders in the general field is to fall off as the winter season approaches owing to the desire among buyers to secure spring delivery, but the indications, as far as the purchases by the railways are concerned, is that they may be ex-

pected to exceed the total of the year 1922. But the orders for additional purchases are of such interest that they are being followed.

There are many reasons for the recent order of the railways for buses. First, the railways are realizing how many new passengers among the bus users. But of a more important record, how a railway is realizing a number of companies which may reasonably be expected to become large purchasers of equipment in the future. The very nature of the territory in which the companies are now located and the need of the fast growing population, in many cases remotely served by some of the present railway lines, bear out this prediction.

Another important piece of evidence which the recent record of orders affords is the wide variety of the equipment specified. The orders are for practically every type of equipment from the modest cross seat bus to the limousine type of sedan bus and the double-deck coach such as the Louisville Railway proposes to operate. This in itself shows the trend of the times and indicates the growing evidence among the railways of their appreciation of the mobility of the bus as a means of transportation.

## Rumors of Another Tire Price Cut

Rumors of a further reduction in the price of rubber tires have been current during the first days of August. These reports naturally had a disturbing effect in the security market, but officials of the larger tire companies were quick to deny them. In some quarters it is pointed out that while the major manufacturers were adhering to their list prices for tires, they were offering larger discounts to dealers. This practice, it is argued, makes for further unsettlement of the market, as there is apparently no established price for tires. As a result similar products often sell at different prices in a single community.

Akron, Ohio, the center of the rubber industry, reports no let-up in the demand for bus and truck tires, although the demand for pleasure car tires is now only about 70 per cent of the peak of early spring.

The Kelly-Springfield Company is said to have guaranteed prices to dealers until the fall, and the United States Rubber Company is said to have given no consideration to the matter of price reduction. Other manufacturers are also reported as not contemplating any immediate change in price. Nevertheless, the rumors about reductions persist.

## Gasoline Prices, July 25, 1923

City	Cents per Gal.	
	Tank Wagon	Service Station
Albany, N. Y.	21 5	24
Alton, Ill.	19	22
Boston, Mass.	21 5	24
Chicago, Ill.	20	22
Detroit, Mich.	21 4	23 4
Fort Worth, Texas	17	21
Indianapolis, Ind.	19 8	23 8
Jacksonville, Fla.	17	22
Kansas City, Mo.	19 5	22 5
Louisville, Ky.	20	23
Memphis, Tenn.	17	21
Milwaukee, Wis.	20 6	22 6
Minneapolis, Minn.	21 5	23 5
Mobile, Ala.	17	21
Newark, N. J.	20 5	23 5
New Haven, Conn.	21 5	23 5
New Orleans, La.	15 5	18 5
New York, N. Y.	21 5	24
Oklahoma City, Okla.	13	16
Philadelphia, Pa.	20	23
Pittsburgh, Pa.	20 5	23 5
Richmond, Va.	20 2	22 5
St. Louis, Mo.	21 5	23 5
Salt Lake City, Utah	16	19
San Francisco, Cal.	17	21
Seattle, Wash.	20 5	24 5
Spokane, Wash.	20	22
Washington, D. C.		

## Nine States Defeat Gasoline Tax Measures

Legislatures of nine states in session this year defeated attempts to establish a gasoline tax, while six others defeated increases. In five states legislation was enacted increasing a tax already established, while in twenty-five states where there has been no tax prior to 1923, measures were introduced designed to establish one. Minnesota adopted a bill providing for a change in the State Constitution so that a gasoline taxing statute may be enacted.

The accompanying list gives the states in which a gasoline tax exists, the amount of the tax, and indicates whether the tax is old or new.

Alabama (new).....	2c.
Arizona (old).....	1c.
Arkansas (inc.).....	1c.
California (effective Sept. 30, 1923).....	2c.
Colorado (effective Aug. 1, 1923).....	2c.
Connecticut (old).....	1c.
Delaware (new).....	2c.
Florida (effective July 1, 1923).....	3c.
Georgia (new).....	3c.
Idaho (new).....	2c.
Indiana (new).....	2c.
Kentucky (old).....	1c.
Louisiana (old).....	1c.
Maine.....	1c.
Maryland, 1c. until Jan. 1, 1924; thereafter	2c.
Massachusetts.....	1c.
Mississippi.....	2c.
Montana (inc.).....	2c.
Nevada.....	2c.
New Hampshire, 1c. July 1 to Dec. 1,	2c.
1923, thereafter.....	2c.
New Mexico (old).....	1c.
North Carolina (inc.).....	3c.
North Dakota.....	1c.
Oklahoma.....	1c.
Oregon (new).....	3c.
Pennsylvania (effective July 1).....	2c.
South Carolina (new).....	3c.
South Dakota.....	2c.
Tennessee.....	2c.
Texas (new).....	2c.
Utah (new).....	2c.
Vermont (new).....	1c.
Virginia (effective July 1).....	3c.
Washington, 1c. now; after Jan. 1, 1924	2c.
West Virginia, 1c. to July 23, 1923;	2c.
thereafter.....	2c.
Wyoming (new).....	2c.

†Subject to a referendum if 15,000 voters sign petition within ninety days after May 24, 1923.

Iowa defeated an effort to enact a 2-cent tax and Kansas defeated a 1-cent tax bill. Maine refused to pass a tax of 2 cents, while in Michigan, Missouri, Nevada, New Jersey legislatures defeated gasoline tax measures. Tax increases in New Mexico, Oklahoma, Oregon, Tennessee and Vermont were also defeated.

## Oil Refineries May Shut Down

Every oil refinery in the mid-continent fields may cease operations during August as a result of a recommendation to that effect issued recently by a group of leading refiners after a conference in Chicago. Should the refiners actually carry out their expressed intention all hope of cheaper gasoline for an indefinite time is lost, the dealers declare.

The proposed action, regarded by the pioneers of the industry as the most drastic on record, is intended to permit absorption by the trade of what is said to be the unprecedented surplus existing at present, thus bringing about a stabilization of the market.

The principal wells in the affected territory are in Texas, Oklahoma, Pennsylvania and Kansas. Leaders in

the movement to shut down were: E. W. Marland of the Marland Oil Company of Ponca City, Okla., which controls the Ponkawah pools, and J. S. Cosden, head of the Cosden interests. Officials of the Western Petroleum Refiners' Association and the American Oil Association declared that heads of more than a score of the largest mid-West plants have already resolved to carry out the recommendation.

## Rolling Stock

Hiram W. Johannes, Clintonville, Wis., will operate a twelve-passenger Reo on his line between Clintonville and Shawano, Wis.

E. M. Moore, operating the Bellevue-Sandusky, Ohio, bus line has discontinued business and has offered his equipment for sale.

Pickwick Stage Company, Milwaukee, Wis., will place a twelve-passenger Packard in service between Milwaukee and Oconomowoc.

Oscar Luedke, New London, Wis., will place in service a twenty-passenger Menominee bus to ply between Wisconsin Rapids and Baron.

Madison-Kilbourn Bus Company, Madison, Wis., has ordered two Stoughton sedan type buses for use on its Middletown-Baraboo, Wis., line.

Edward F. Kroening, Menominee Falls, Wis., has purchased a White for use on his bus line between Milwaukee and Menominee Falls.

Los Angeles Railway, Los Angeles, Cal., has received eighty-one Model 50 White passenger buses for use on lines in Los Angeles and vicinity.

Herman Meier, Madison, Wis., has recently purchased a twenty-passenger Stoughton bus for use on his line between Madison and Monroe, Wis.

M. C. Juergmeyer, Kaukauna, Wis., recently purchased one Reo and two Menominee buses for use on his line between Kaukauna and Appleton, Wis.

Charles Destache, Green Bay, Wis., will soon place in service a twelve-passenger Menominee car for use between Sturgeon Bay and Green Bay, Wis.

Rowley Crandall and Otto Auston, operating in Ladysmith, Wis., are considering the purchase of a new fifteen-passenger bus to replace one recently destroyed by fire.

Howard Ashell, operator of a bus line between Huntsville and Moberly, Mo., recently ordered a White De Luxe coach with a carrying capacity of fourteen passengers.

Chicago, North Shore & Milwaukee Railway, Highwood, Ill., recently installed a twenty-nine-passenger Fageol coach on its line from Lake Geneva to Milwaukee, Wis.

Wisconsin Rapids Bus Company, Wisconsin Rapids, Wis., recently organized, has purchased bus equipment for use on its line between Marshfield and Wisconsin Rapids.

Twin State Gas & Electric Company, Boston, recently ordered two buses from the White Company, Cleveland, Ohio, and one from the Stewart Motor Car Company, Buffalo, N. Y.

A. H. Hal, Bouldie, Mo., operating a bus line between Bouldie and Marshall, Mo., is contemplating the purchase of an additional bus to accommodate his increased business.

Eastern Wisconsin Electric Company, Oshkosh, Wis., has added a sixteen-passenger White car to its equipment. The new car will operate between Neenah, Fond du Lac and Sheboygan.

Gettysburg - Harrisburg Transportation Company, Harrisburg, Pa., has added a sixth bus to the fleet operating over this line. The new bus is equipped with a specially built McKay body.

Eastern Wisconsin Transportation Company, which operates a bus line between Fond du Lac and Madison, Wis., has recently purchased five new White twenty-passenger cars for use on that line.

St. Louis Board of Education on July 10 authorized the purchase of two motor buses to be used to carry pupils to the new school for crippled children. The dates for making the bids will await the drafting of specifications for the buses.

Montgomery Bus Company, Bryn Mawr, Pa., has recently added an additional AJXL Ultimate bus to its fleet of six buses operating in that territory. The AJXL Ultimate is manufactured by the Vreeland Motor Company, Inc., Newark, N. J.

Watertown Transportation Company, Watertown, N. Y., has purchased two Model K-16-B chassis, 150-in. wheelbase, made by the General Motors Truck Company. They will be delivered about Sept. 1 and the company plans to install two of the bodies now in service, rebuilt for the new chassis.

Missouri-Kansas-Texas Railway has purchased two additional buses, each with a carrying capacity of twenty-five persons, which it will put in service to carry its employees from the Union Station in Denison, Tex., to its new freight terminals, roundhouse and repair shops, 1½ miles west of Denison.

Central Transportation Company, Trenton, N. J., a subsidiary of the Trenton & Mercer County Traction Corporation, has placed an order for five buses to be used on its new line in Trenton and vicinity. The machines will be a White Model 50, Kuhlman Standard Type C, motor bus body. Each will have a capacity of twenty-five passengers.

## Shops and Garages

Richmond (Va.) Rapid Transit Corporation has purchased a new garage on Cary Street for the storage and repair of the buses operated by the line. The purchase price was \$25,000. Officials of the company are expecting to increase the equipment owned by the company in the near future should petitions for increased service be granted by the city.

Interstate Terminal Building, a new bus terminal for operators in Portland, Ore., is to be erected at a cost of \$200,000 on the block bounded by Fifth, Sixth, Salmon and Main Streets. The finances will be raised through sale of a \$200,000 issue of first mortgage 7 per cent gold bonds. These securities will be issued in denominations of \$100, \$500 and \$1,000, and will have maturities from 1925 to 1935. A permit has been granted to erect a temporary auto-stage terminal building on the block to be used for five months, during the construction of the permanent terminal building. The company will begin operation out of the temporary terminal at once. Estimated earnings of the structure, from rentals and other sources, is expected to be two and one-half times the annual interest charges.

## Business Notes

M-B Automotive Corporation, Wilmington, Del., recently filed a charter with the Secretary of State of Tennessee as a preliminary step toward the establishment of a plant in Nashville for the manufacture of motor buses and automobile accessories. The firm is capitalized at \$10,000,000.

O. H. Browning, who has made an enviable record in truck sales at the Philadelphia and Chicago offices of the International Harvester Company of America, has been placed in charge of international sales in New York City and the adjacent metropolitan territory. Mr. Browning went to work for the McCormick Harvesting Machine Company, a predecessor of the present Harvester Company, in 1881 at an early age. He has been a Harvester man ever since, and as a result of his years of faithful service, many devoted to motor truck sales, has become one of the best-known truck sales organizers in the country.

## Advertising Literature

United States Motor Truck Company, Cincinnati, Ohio, recently issued a pamphlet entitled "Parlor Cars of the Highways" in which its eighteen-passenger sedan-type bus, and pay-as-you-enter buses for eighteen and twenty-six passengers are described.

Manning Abrasive Company, Inc., Troy, N. Y., has just issued an attractive little booklet, in which are combined samples of the company's products and directions for their use by automobile refinishers. The samples include Durandum, Waterproof Speed-Grits and Garnet finishing papers. Methods are described of sanding metal, wood, or painting material such as would require refinishing. Copies of this booklet are available on request to the company.



# BUS TRANSPORTATION



New York, September, 1923

## A Review of How the Buses Are Handling Passengers During the New Jersey Transportation Controversy

For a month the bus has been the only local transportation medium. During the normal hours of the day the bus lines in general handle traffic with little or no waiting on the part of passengers. During rush hours overcrowding of buses is prevalent. At some heavy loading points delays occur during the evening peak of the rush hour. Suburban service out of Newark has been poor. Touring cars are used only in Jersey City and Camden. A transfer system has been started by three bus lines in Jersey City. Turnback and express service established to increase effectiveness of vehicle use

previously without bus service. As for the sight-seeing bus, it was tried in a limited way, but it did not prove successful for handling local traffic. A few such vehicles are still being used in Newark to furnish service to manufacturing plants in outlying districts, but probably not more than six or seven are in use even in this service. In an entirely different form of service the sightseeing bus is proving its value. This, however, is in its own field of work. It is, for instance, being used to good advantage to carry pleasure seekers from the ferry at Edgewater, N. J., which is across the river from 125th Street, New York, to Palisades Park.

But what is the bus actually accomplishing? The record of performance in figures cannot be written at this time. It is too early for that. The individual operator knows that he is being called upon to perform extraordinary feats. The records of his receipts, however, are a better criterion to him than any personal observations which he makes in the course of the daily work. But the records of his performance are as yet his own. Later on the figures will all be matters of public record. It will then be a case of "Now it can be told," to use an expression from Philip Gibbs. At present the best that can be done is to hint at some of the figures. On some Newark bus lines, for instance, average daily figures of passengers carried before Aug. 1 and since then follow:

### Newark Lines Daily Figures

	Now	Before
Clinton Ave.	45,000	15,000
West Orange	65,000	20,000
Bloomfield	40,000	20,000
Roseville	20,000	9,500
Springfield Ave.	62,000	24,000
Kearney-Arlington	35,000	28,000

The bus situation in New Jersey was pretty well covered in the sur-

**B**USES are handling practically all the local transportation in New Jersey in the territory formerly served by the Public Service Railway. They have been doing this ever since Aug. 1. It is a transportation problem of the greatest magnitude that the buses have been called upon to meet. And they are meeting it and meeting it well, all things considered. Isolated cases of railway suspension of service somewhat similar to the one in New Jersey there have been before, such as Des Moines, Bridgeport and Saginaw, to mention just a few, but in New Jersey a population estimated at 2,500,000 which depended previously upon both the electric railway and the bus together for local transportation is now depending upon the bus alone. Overnight, as it were, 1,000,000 riders a day were forced to seek new means of transportation.

The bus transportation organization that existed previous to the strike was entirely adequate to the demands then made upon it. It was not, however, adequate to accommodate the sudden load which had to be taken over on Aug. 1. It is not adequate to serve that extra traffic now. But it was augmented and augmented quickly in the cities so that a measure of service is being furnished that fairly well meets the present demand. The extent to which the bus equipment has been aug-



*Getting on a bus at Park Place Terminal in Newark during the evening rush hours is difficult*

mented is shown by the fact that in Newark alone 230 extra vehicles were put on, while in Paterson thirty-two extra vehicles were placed in service, in Jersey City twenty, Elizabeth fifteen to twenty, and Camden seventy-five to 100. The touring car does not enter the picture as a means of transportation in the present emergency, except in Camden and on two routes in Jersey City





Queue loading at Summit Avenue station, Jersey City, at noon on Aug. 18, 1923, on Bayonne line. Note sidewalk signs

vey of the state which was published in BUS TRANSPORTATION for August, 1922. At that time there were in the entire state 1,722 vehicles operating over 174 routes for a total length of 1,300 miles. Since then figures for 1922 have been compiled for traffic on buses operating in competition with the Public Service Railway. They show a total of 141,326,123 passengers. It is a remarkable picture of growth that the comparative bus figures for 1920, 1921 and 1922 present. They are shown in the table on page 414.

This account is not a statistical study. It is out of the chronicle of the day, however, that a reservoir of fact is created from which deductions may later be drawn. The statistics will be the subject of study in a later issue. The proponents of the bus, however, need have no fear that the future seeker for truth at these sources of original information will search in vain for the evidence to bear out the statement that the bus is doing a very good job in the present emergency. Observations made

on the ground bear this out. Just how much of the traffic of 1,000,000 passengers a day formerly handled by the Public Service Railway the buses have been called upon to carry is a guess at best. The biggest problem has, of course, presented itself in Newark.

The lines of the Public Service Railway pretty well gridiron the entire state, but Newark is the center of the system. It is the state's largest city. Its population is 350,000. It has an itinerant population of about 100,000 more. It is the center of industrial activity of northern New Jersey. As Newark is the center of this system, so the Park Place terminal is the center of Newark. Here it is that traffic converges that is destined to New York. In the morning and in the evening the Hudson & Manhattan Railroad, operating from this terminal, is called upon to perform transportation marvels. Likewise have the buses been called upon to perform similar marvels at this point.

At this terminal an observer

watching the handling of the crowds by bus in the evening rush hours was heard to say "Frightful! Terrible!" And in a sense it was. But only in a sense. The situation was not one made by the buses. It was forced upon them. Remember that. It is a mighty important point if one is not to lose his sense of proportion. The situation there is bad. It might easily be worse. It could be much better. Even without any additions to the present bus equipment, it could be improved. The policing is inadequate. In fact, there is no policing. A condition can easily be imagined of an attempt to handle the rush-hour crowd by bus from a terminal discharging every few minutes an eight-car train loaded with standees. Queue loading of the buses would help. It would not solve the problem, but it would at least introduce order where now only confusion exists. Much of this confusion, however, is unnecessary. It is due to the impatience of the traveling public. This is the same impatience that is encountered everywhere in handling transportation.

At the terminal in Newark in the evening the public storms the buses as they approach the curb in front of the station. The race is indeed to the strong. But it ought not to be. The weak ones stand in the buses or put aside the thought of getting home until a lull comes in traffic. This was the picture presented previous to Aug. 15. On that date the plan suggested by Joseph Crawford, city supervisor of buses at Newark, was adopted by which buses are loaded at two sides of the terminal. Elsewhere in the same territory, notably at the Summit Avenue station and at Exchange Place in Jersey City, the problem is handled much better.

Over on Broad Street in Newark the situation is also somewhat bad in the rush hours. Broad Street is the principal north and south thoroughfare of the city. Market Street is the principal east and west thoroughfare. The intersection of these streets is one of the heaviest traffic points in the country. On these streets are located the principal stores and shops. Traffic is handled pretty well on these streets in the non-rush hours. There is a marked tendency in the evening rush hour for intending passengers to walk in the direction from which their particular bus approaches the city. This results in some piling up of traffic, but the conditions are far

One of the latest type buses put into service on the Lafayette-Greenville line in Jersey City. At the right, sidewalk signs are used to designate the bus stopping points. This particular sign applies to the North Hudson County Boulevard line in Jersey City





from unbearable. Maggie and Mamie and George and John may be pushed, shoved, crowded, and compelled to stand when riding, but this is not intended to be a record of individual experiences. People are being carried. They appear to accept the situation philosophically. This is quite true of the public all over the state. They probably think how much worse the condition would be if they were compelled to resort to a system of transportation improvised entirely overnight.

As indicated before, Newark with its 300,000 people offered the greatest problem in handling traffic. Ranking next to Newark, perhaps, in point of traffic offered, comes Camden. Here the rush-hour peaks are heaviest. In Paterson, Passaic and Elizabeth the situation on the whole at all hours is fairly satisfactory.

In some cases merchants have complained that apparently only those people are using the buses who have to ride and that their trade is falling off. It is largely necessity riding that is being done. Public officials everywhere, however, are strong for the bus. Differences of opinion exist as to the extent of the part that the bus can be made to take eventually in the New Jersey transportation picture, but the motor bus has become a great force with the public. This was indicated best, perhaps, by the opinions expressed at the hearing before the Board of Public Utility Commissioners at which it was sought to require the railway to show cause why it should not resume service. Some of the representatives of the smaller cities said it was not a matter of concern to them whether the railway ever started up again. The Elizabeth bus men in particular received a great boost at the meeting.

As indicated before, many of the vehicles now in service were licensed by the municipality only for the duration of the strike. They have met the emergency, but in some cases they have been the cause of friction. The foreign vehicles had to be taken into the line pools and guaranteed the same share in earnings as the members of the pools. In addition, the foreign owners insisted the association pay the insurance premium demanded by the cities as protection to the traveling public, and further when the fifteen days of grace for the foreign vehicles in New Jersey expired they wanted the local bus association to pay for the \$35 state omnibus licenses. Where vehicles had not been licensed by the federal



*In Paterson the bus terminal is located in the rear of C. & H. The highest type of buses to be found here.*

government they wanted the local men to pay that tax also. The outcome was that these demands had to be met to keep one hundred foreign buses in Newark. A special insurance premium rate of \$12.50 was established for the first fifteen-day period of the temporary permit and a \$19.50 rate for renewal.

On their part the regular operators have indicated a willingness to augment their services, but are unwilling to do so without some assurance that any permits granted to them will retain the right to operate in the future. At a conference on Aug. 22 Chairman Osborne of the Public Utility Commission announced that the board would approve long-term permits for additional buses if these were necessary to meet the emergency. It is for the local authorities to judge whether they deem such permits necessary to supply the service that the people require. When this is done the responsibility is then passed along to the Public Utility Commission, which has the power of approval or disapproval of such permits. The consensus of opinion of the jitney supervisors in attendance at the meeting on Aug. 22 was that long-term permits should be issued. Emanuel Herman, representing the owners of

buses in Essex County, said that the permits for six months and one year which had been suggested would not meet the situation. They were not for a period of time sufficiently long to attract the investment necessary to warrant the expenditure for up-to-date buses.

So far as the Public Utility Commission is concerned its jurisdiction over the buses is laid down by the limits of the law. Licenses to operate are not issued by the commission. They are issued by the municipalities. Licenses issued subsequent to March 15, 1921, except renewals, to be valid, must be approved by the board if the bus is to be operated on the same street as a railway. Up to Aug. 1 the board has not approved any licenses for buses except upon proof of public convenience and necessity.

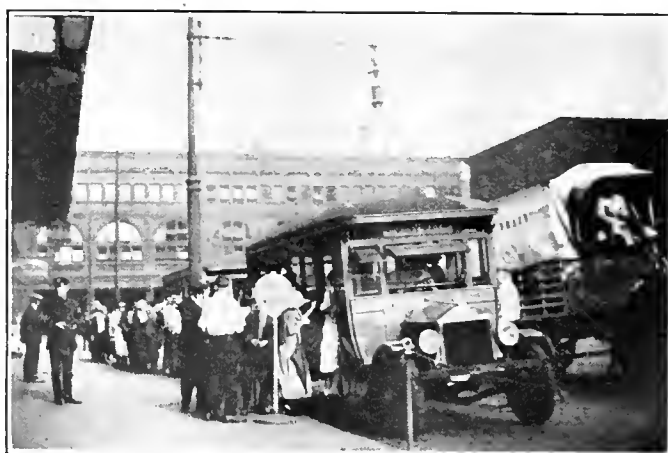
Bear in mind that there is a large measure of local bus regulation in New Jersey. The fare by bus locally in Newark, Paterson and Passaic is 5 cents, while in Jersey City it is 10 cents and in Camden 7 cents. These rates have been strictly adhered to in the present emergency. In Jersey City a transfer arrangement was put into effect on Aug. 21 on the Montgomery, Lafayette and Bergen Street routes which provides

*At Exchange Place, Jersey City, loading conditions are very orderly.*





*One of the sightseeing buses pulling out of Exchange Place, Jersey City*



*Loading point in front of tube station at Exchange Place, Jersey City*

for free transfer of passengers by those three routes. This means that one can now travel from downtown Jersey City to the end of the Bergen Street line at the Summit Avenue Station for 10 cents where before the fare had been 20 cents. Credit for working out the details of this arrangement is due largely to the efforts of Joseph Colford, local city supervisor in Jersey City.

In Camden the most difficult point to handle is the terminal of the ferry to Philadelphia. Especially during the evening rush hours the traffic assumes large proportions. A recent count of the business loaded and leaving this terminal during one of the evening rush hours showed 117 buses a minute. There are 232 buses and 146 touring cars in service in Camden. This includes eighty-eight extra buses temporarily licensed.

The touring cars serving Camden are being used somewhat differently than in Jersey City. In Camden they are kept out of the ferry terminal during the evening peak hours and are given the job of taking care of the traffic that originates along the main streets of the city. This plan was evolved to obtain a more efficient use of loading spaces at the terminal; the buses with their larger carrying capacity take up less space on the basis of the number of people handled.

During the normal hours of the day the touring cars are permitted to run into the ferry terminal to dis-

charge and load up again. All things considered, Robert S. Burns, supervisor of bus operation for the city, indicates that as an emergency measure the buses are handling the traffic well, but much improvement would be necessary were buses to be the only permanent means of transport.

Another fact worthy of recording is the lack of serious accidents during the month. There have been accidents it is true; in fact, one person was run over and killed, while others have been injured boarding moving buses. In another case, a touring car coming from the left and turning into Hudson County Boulevard hit a bus and caused the driver to run into a tree in attempting to avoid the collision. Some of the passengers were hurt, but none seriously. The bus was considerably damaged.

A feature favorable to safety of operation has been the dry streets, for there has been little or no rain during the daylight hours.

One startling result of the present Jersey situation is the extent to which vehicular traffic is speeded up. With the trolleys off the street all traffic moves much faster. It has been found possible to decrease scheduled running time of the buses at least 20 per cent. Another measure that has helped to expedite bus traffic is the use of the turnback. Buses are being started at intermediate points, and after arriving at traffic centers are deadheaded back empty to increase the number of effective trips. In the evening this process is reversed, and instead of all buses being run through to outside terminals some are run only

over the most congested part of the routes. This plan has also been used in Newark, on the Clinton Avenue, the Springfield Avenue and South Orange Avenue lines. It is being applied with particular effectiveness on the Jersey City Hudson County Boulevard lines. In Jersey City express service is being given in the evening rush hours over a part of the line covered by the short-line service. There also the people have been taught the advantages of queue loading both at Exchange Place and at the Summit Avenue Station of the Hudson & Manhattan Railroad. As a result the loading time of buses has been decreased materially over that taken at other points where traffic originates and has reacted favorably on the bus passengers.

Passengers heretofore traveling by trolley in and between northern New Jersey suburban towns have been dealt a severe blow by the withdrawal of the railway service. The substitute bus service has proved inadequate, due to infrequent headway. There were only a few lines of this kind before Aug. 1, and no special attempt has been made to augment them except between Newark and Montclair. Before the strike many suburban bus lines were not allowed to handle local traffic from points where they tapped railway territory. On such routes as the Newark-Paterson and the Boonton-Newark the operators are now permitted to do this local business.

**Record of Jitney Traffic on Lines Competing With Public Service Railway Company**

Year	Newark	Jersey City	Bayonne	Hoboken	Elizabeth	New Brunswick	*Perth Amboy	Paterson	Passaic	*Camden	Totals
1920	41,501,854	6,564,456	5,086,760	2,275,144	5,286,358	1,620,228	1,403,855	9,145,353	3,674,834	1,181,952	77,740,794
1921	53,273,800	8,524,140	5,560,360	2,365,344	5,268,313	1,445,564	1,760,548	14,570,752	4,427,026	5,453,692	102,649,539
1922	75,654,457	13,222,831	7,533,200	2,440,600	7,540,413	1,721,588	1,732,447	18,278,030	6,569,388	6,444,557	141,326,123

\* Includes passengers carried in city limits only

# Some Fare Collection Experiments in Cincinnati

**Pay-Enter Pay-Leave Scheme Speeds Up Schedules on Line to Norwood — Why Strip Tickets Prove Unsuccessful — Drivers Initiate Records of Operation Covering Gasoline, Oil and Tires**

**F**OR the length of time that it has been operating, the Cincinnati (Ohio) Motor Bus Company has tried more innovations for the improvement of its service than probably any other bus company in that locality. Some of them have proved helpful, while others were impractical. The company was organized in November, 1922, and began the operation of its first bus on the twenty-fourth day of that month. Its equipment at the start comprised four solid-tire buses, each with a seating capacity of twenty passengers. After six weeks of operation these were replaced with Ace Model C buses manufactured by the American Motor Truck Company, Newark, Ohio. These buses are equipped with all the latest devices, including dual pneumatic tires. The solid-tire buses proved unsatisfactory from the standpoint of operation, they were rough riding and it was almost impossible to maintain a competent operating schedule with them.

Today the company operates six Ace buses with a capacity of thirty passengers each between Cincinnati and Norwood, a distance of  $6\frac{1}{2}$  miles, and has ordered three more of the same type.

Early this year the company inaugurated the pay-enter system on its line, in an effort to facilitate the transportation of its passengers. The system worked successfully in bringing passengers from the suburban districts to the city, but on the outbound trips it proved a disadvantage from the standpoint of loading passengers in the congested district. During the rush hours the buses lost between ten and fifteen minutes in loading passengers.

To take advantage of the time saved by the system on inbound trips, and to eliminate the time lost with the system on outbound trips, the company put into effect the pay-as-you-leave system on outbound trips. This arrangement has been a

success and has helped the company materially in maintaining a steady bus schedule. In each bus is a sign urging passengers on outbound trips to approach the fare boxes a block before their destination when change is necessary from the driver. This gives the driver ample time to make change and only a fraction of a minute is lost in discharging passengers.

The pay-enter system on inbound

tickets were sold by the drivers in strips of six for 55 cents. After a trial for six weeks this system was discarded because it had not produced the anticipated results. The public did not take to it and furthermore it proved troublesome to the bus drivers. In devising this system the company was of the opinion that the working class of people would readily take to the ticket proposition for two reasons: it would result in a



*One of the buses operating between Cincinnati and Norwood*

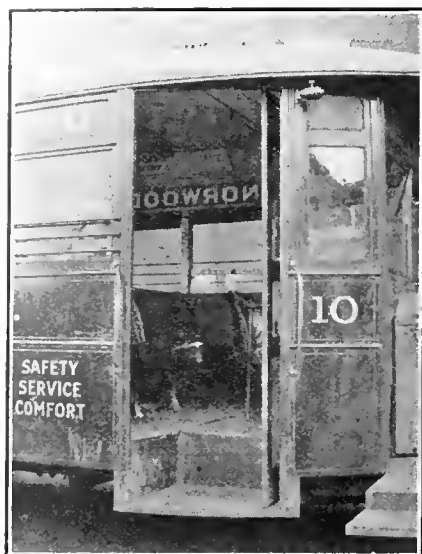
trips also has proved a time saver, because in the suburban districts the concentration of traffic is not heavy and the passengers drop their fare in the boxes as they step into the bus. Where it is necessary for the driver to make change, this is done while the bus is traveling. Aside from the time lost with the pay-as-you-enter system on outbound trips, the drivers missed many fares by the passengers crowding into the buses in the congested districts.

This arrangement has lightened the work of the drivers and they are seldom behind schedule time, except for an accident or a breakdown.

With this double system in practical operation the company then sought a greater time saver and incidentally one which it thought would prove beneficial to its patrons, that of selling tickets. This system was inaugurated on May 1. The

saving in fares and would facilitate the movement of the buses.

In addition to interfering with the operating schedule, the system proved impractical from the standpoint of the driver, because in many instances he was compelled to make change in selling tickets, where the loading and unloading of passengers was heavy. This resulted in some instances in loss of time aggregating from five to ten minutes per trip. Furthermore only 12 per cent of the total volume of passengers carried by the company bought tickets, and this small percentage resulted in a loss in time and money, in so far as the system was concerned. The company transports on an average 125,000 passengers a month. Four buses are operated from 5 o'clock in the morning until midnight, while two additional buses are put into service during the morning and evening



*A close-up of the entrance*

rush hours. The public did not favor buying tickets in strips of six for 55 cents because the investment netted a saving of less than one-half cent on a ticket on the basis of the 10-cent cash fare.

Another reason why the ticket system was not favored by the public was because the bus company operates along a route traversed by four street car lines. It was found that the public in this particular case boards the first conveyance that comes along. The street car company also sells tickets and the public was not inclined to buy tickets for the two systems, when it relied on either for means of transportation.

In some instances the public in buying bus and street car tickets dropped bus tickets in the street car fare boxes and street car tickets in bus fare boxes. This situation was largely due to the fact that the bus and traction companies' tickets were of the same color and size. The only difference between the two was the inscription, and because of the small print, this was only visible at close scrutiny.

The drivers were not in accord with the system because they were held responsible for all tickets given them to sell and oftentimes they were lost, through no fault of the drivers. The owners of the bus company are of the opinion, however, that the ticket system could be worked out successfully where a bus company does not operate in competition with a traction line.

#### TIME CARDS FOR DRIVERS

In an effort to get an exact record of its cost of operation the company has devised a time card system. These cards are given daily to the drivers. The morning and afternoon drivers of each bus make their reports on the same card as shown in the illustration. From these reports, the auditor of the company figures the cost of operation of each bus.

The company also started a profit-sharing plan among its drivers, in an effort to get steady and competent men, but the plan proved un-



*All buses are equipped with a No. 5 Cleveland fare box*

satisfactory and was abandoned. Through experience the company estimates the average stay of a driver with one bus company is three months. Many of the drivers possess a roaming disposition and it is not difficult for them to get employment in or near Cincinnati.

#### Power Consumption of Trolley Bus

A TEST of the four-motor trolley bus of the Trackless Trolley Company of America, New York City, described in BUS TRANSPORTATION for June, 1923, page 290, was made recently under the auspices of the engineers of the Commercial Truck Company, with several General Electric engineers in attendance.

The vehicle with passenger load weighed about 7.75 tons. On a level stretch of concrete road it drew about 13.5 amp. at 575 volts, making a speed of 16.25 m.p.h. This corresponds to 61.5 watt-hours per ton-mile, and about 475 watt-hours per vehicle-mile. With the controller in the parallel position the current was 34.8 amp. at 569 volts, with a speed of 25.4 m.p.h., corresponding to about 100 watt-hours per ton-mile, or 780 watt-hours per vehicle-mile.

After the car was well limbered up, a run of 20 miles was made. On the level at 25 m.p.h., the current consumption was 30 amp. at 555 volts, or 666 watt-hours per vehicle-mile. On a 7 per cent grade the current increased to 80 amp. and the speed was reduced to 12.5 m.p.h.

This side to be filled out by MORNING driver.

NOTICE—Operators when taking busses from garage shall see that bus is provided with one of these reports and fill in the information asked for.

**DAILY BUS REPORT**

Driver's Name \_\_\_\_\_

Bus No. \_\_\_\_\_ Date \_\_\_\_\_

Time leaving garage \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

Speedometer when leaving garage \_\_\_\_\_

Time relieved \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

**CHANGING TIRES**

Time \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

Kind removed (Mfg.'s Name) \_\_\_\_\_

Serial No. \_\_\_\_\_ Speedometer Register \_\_\_\_\_

Tire applied (Mfg.'s Name) \_\_\_\_\_

Serial No. \_\_\_\_\_

R. Rear inside ☐ outside ☐ Right front ☐

L. Rear inside ☐ outside ☐ Left front ☐

**GASOLINE and OIL**

Gas \_\_\_\_\_ gallon Oil \_\_\_\_\_ qt.

Filled by \_\_\_\_\_

These reports shall be turned into the office every day.

Total mileage \_\_\_\_\_

THE CINCINNATI MOTOR BUS CO.

B1542

This side to be filled out by AFTERNOON driver.

NOTICE—Operators when taking busses from garage shall see that bus is provided with one of these reports and fill in the information asked for.

**DAILY BUS REPORT**

Driver's Name \_\_\_\_\_

Bus No. \_\_\_\_\_ Date \_\_\_\_\_

Time relieving \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

Speedometer when entering garage \_\_\_\_\_

**CHANGING TIRES**

Time \_\_\_\_\_ A. M. \_\_\_\_\_ P. M.

Kind removed (Mfg.'s Name) \_\_\_\_\_

Serial No. \_\_\_\_\_ Speedometer Register \_\_\_\_\_

Tire applied (Mfg.'s Name) \_\_\_\_\_

Serial No. \_\_\_\_\_

R. Rear inside ☐ outside ☐ Right front ☐

L. Rear inside ☐ outside ☐ Left front ☐

**GASOLINE and OIL**

Gas \_\_\_\_\_ gallon Oil \_\_\_\_\_ qt.

Filled by \_\_\_\_\_

These reports shall be turned into the office every day.

Total mileage \_\_\_\_\_

THE CINCINNATI MOTOR BUS CO.

B1542

*Daily form of report card used by drivers. Separate sides are used by each driver as noted*

# A Day Card That Forms the Basis of an Accounting System

**All Statistics Pertaining to Operation, Passengers Carried, Average Rate of Fare Paid, Mileage Operated per Bus per Day, Can Be Secured with a Minimum of Effort**

[illegible]

*Sample of form used by drivers connected with the Red Star  
Transportation Company in Ohio*

A SIMPLE daily report sheet is used by the drivers of the Cambridge Transportation Company, Clarksville, Ohio, one of the component operating units comprising the Red Star Transportation Company of Ohio. This report, which is shown in the illustration, when properly filled out is a record of all the traffic handled by each bus driver per day, together with operating statistics covering the mileage run, the expenses if any and wages which the drivers deduct from their cash collections.

This basic record then is available for preparing a more complete record of the entire operations, covering both the receipts and expenditures on either a daily, weekly, or monthly basis.

By referring to the illustration it will be noted that the bus number is given with the date and time of the run and a space is provided for each class of or amount of fare. The number of each class of fare is recorded in the column provided. After all tickets are counted the fare is multiplied and the extension or total is placed in the column marked "Special." This heading may be changed to read "Total."

When the driver takes the car out

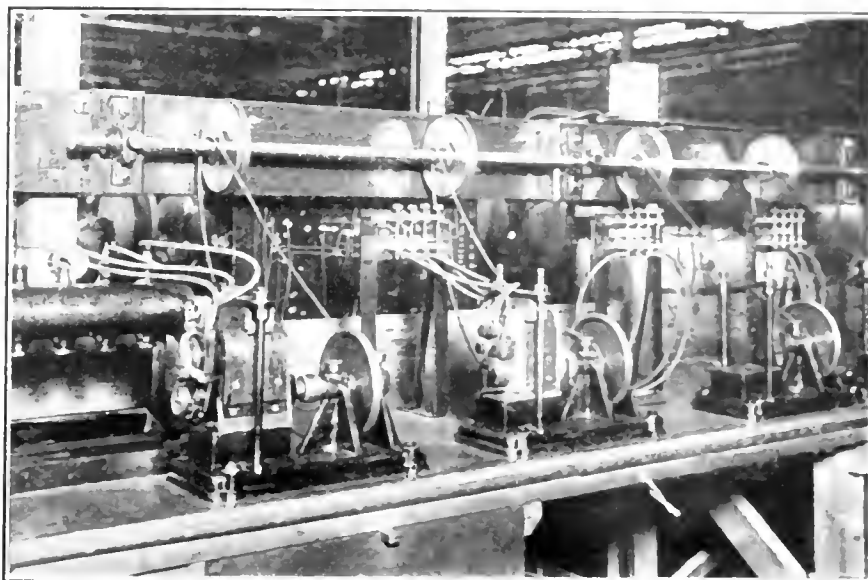
space is provided on the form to show the number of packages carried and the revenue received therefrom. Space is also provided for the total amount of revenue collected.

Any payments for gasoline, oil, repairs made by the driver en route are also shown in the proper place on the day card. The deduction of these expenses from the receipts gives the net amount of cash due the company. Each daily report must of course be signed by the driver. The records given or made on the e forms have been found indispensable for many purposes, as nearly all the information pertaining to operating statistics is given here. The form has been the means of avoiding many errors.

## Testing Magnetos in Bulk

THE arrangement for testing magnetos in the Chiswick Works, London General Omnibus Company, is shown in the illustration. The magnetos are driven from a countershaft, mounted above the test stand. In order to imitate operating conditions a small cylinder, shown at the left, is charged with air to 90-lb. pressure per square inch and the magnetos are tested with the plugs firing against this pressure. At the other positions on the bench they can be fired on a 5.5 mm. (0.022 in.) gap at various speeds.

With these facilities the magnitos are given a running-in test as well as the others already mentioned, so that they are ready for a 15,000-mile run, before they are again overhauled at the Chiswick Works.



*Magneto testing bench used in overhauling London buses*



## Service to the Bus Passenger



### Bus Terminals and Baggage Kinks

No. 1.—The latest bus terminal in California. Two stories, reinforced concrete and cost \$150,000. On Market Street, San Jose, with passenger entrance and four stores along the front. Building runs through the block. J. F. Malony is the manager.

Nos. 2, 3 and 4.—Some kinks, mostly home made, for carrying baggage, mail or parcels. Rear carrier used on Owosso-Flint (Mich.) Bus line, of which Wayne Taylor is president. A tarpaulin cover is used in bad weather. On buses working out of Watertown, N. Y., mail is carried in racks on each side the hood, and parcels in a rack mounted on the bumper in front of the radiator.

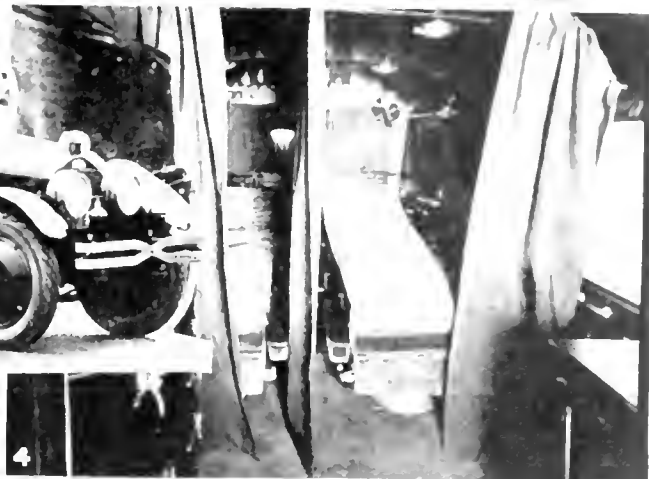
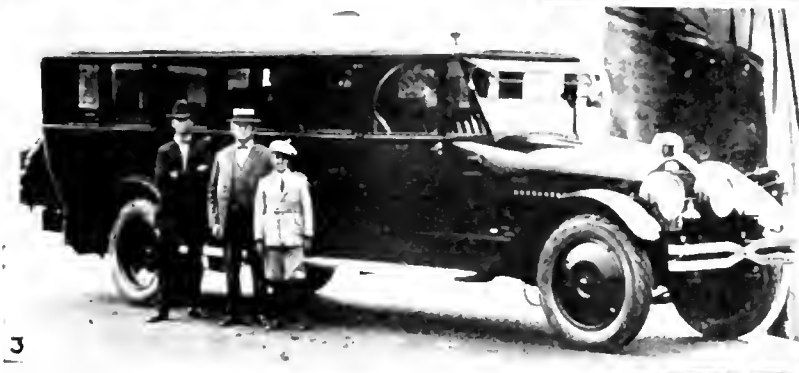
No. 5.—Not so elaborate, perhaps, but it does the job just the same. The Daily waiting room and office at Clayton, N. Y. The buses drive in on a wide concrete roadway, and passengers step into them from the porch.

No. 6. San Jose waiting room has all the comforts of home and more. Listen to this: Cigar store, soda fountain, barber shop, restaurant, taxi stand, men's dressing room with porter, ladies' dressing room with maid, to mention a few of the conveniences.

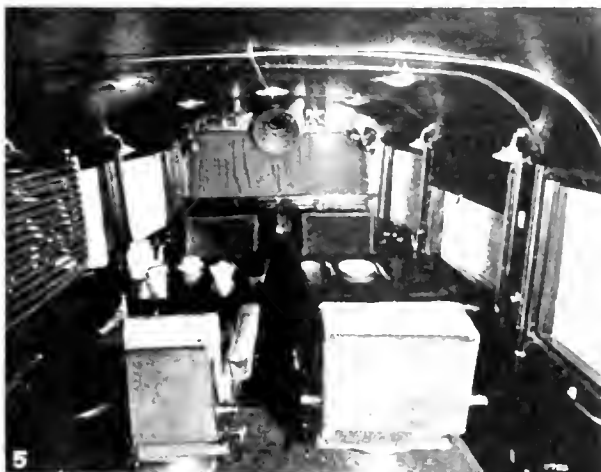
No. 7.—At the rear of the San Jose Stage Depot. Stalls for the stages under cover, with fuel and water supply handy. And see how passengers are handled. Each stage has a pier with platform alongside. These platforms lead directly into the depot. Shown here are stages of the Peninsular Rapid Transit Company, which leases the depot. It is used also by Los Gatos and San Jose buses.







## Special Comfort Features

[illegible]

## Fiat One-Man Bus Has Sixteen Seats



*A European medium-duty one-man bus. Entrance is at left-hand side*

**T**HE development of one-man buses is in keeping with the increasing use of this type of vehicle for inter-urban work in Europe. The latest Fiat passenger vehicle represents a distinct step toward the ideal one-man bus, at least so far as European conceptions go. Everything connected with operation is close to the driver's hand, both with regard to manipulation and passenger control.

The chassis used for the vehicle shown in the illustrations is the Fiat 15-Ter, 30-hundredweight model. This accommodates a sixteen-seat body. The entrance is at the front, on the left, the large folding door, fitting from the roof to the edge of the step, being opened or closed by a lever to the left of the driver.

The opening door automatically

lights a small lamp when necessary, revealing to the passenger two easily-mounted steps. The door cannot be opened from the outside. No room is allowed for standing passengers in the cab, so patrons can pass in and out easily during rush hours. Four interior electric lights are operated from the dash, and a spare wheel is located on the right of the driver between the gear and brake controls and the side of the cab.

All woodwork down to the level of the seats is stained a light mahogany, while the upholstery is of a red imitation leather. A central aisle runs between double seats, all of which face forward, except the two facing the full-width rear seat. The center part of the rear seat can be lifted up to allow the rear emer-

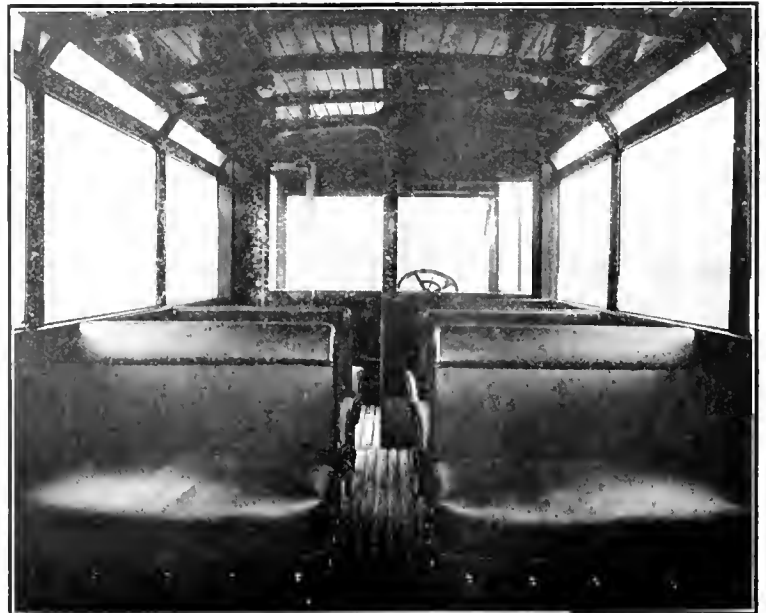
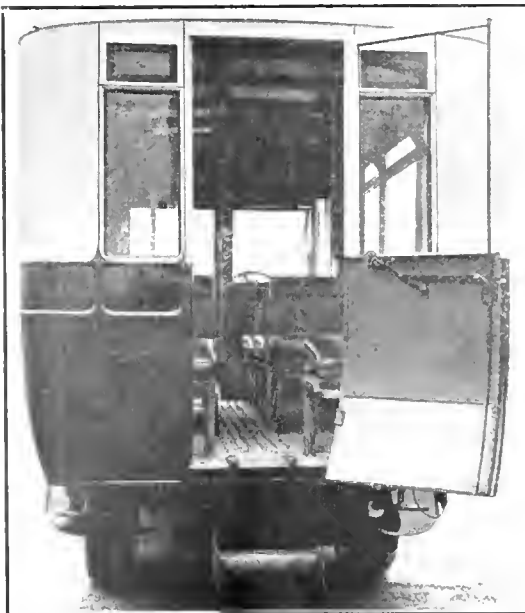
gency door to open and then be let down outside so that, in its inverted position, it forms a step. The idea of constructing the two seats facing toward the rear is to save foot space, as the backs of these, as well as of the seats in front, are directly over the rear wheel housings.

Three long frameless windows, each separately operated by a small windlass underneath, are on either side of the bus, while the usual ventilators are fitted. The window on the right of the driver is divided vertically, permitting either portion to slide over the other when he desires to signal other drivers.

This vehicle sells for about \$4,300 at the present rates of exchange.

## The School Bus Idea Is in Effect

**I**N TENNESSEE a number of counties have established central or consolidated schools and use motor buses for conveying the pupils to and from their homes. These consolidated schools have resulted in better buildings, with a higher class teaching staff, and the cost of education is thereby reduced. A driver is hired to pick up and deliver the children along a fixed route. Most of the buses are Ford chassis with home-made bodies rigged to carry from ten to fifteen pupils. Each bus has a fixed route and a hired driver. With the further development of improved roads this idea will no doubt be carried out to a greater extent, which will create a demand for a better type of school bus.



*At left, rear seat of Fiat drops down to form step, when emergency door is opened.*

*At right, interior of Fiat sixteen-seater*

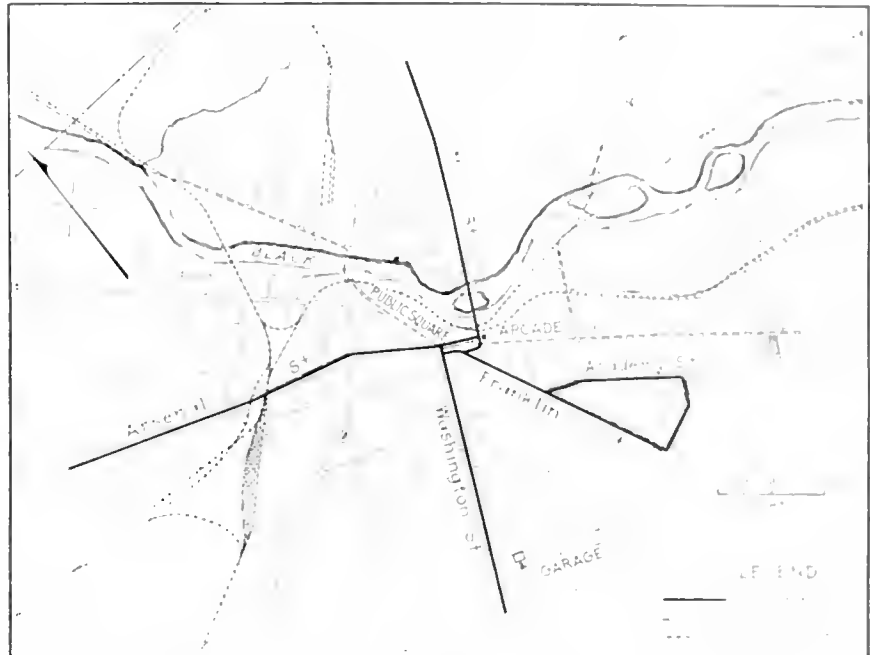
**Applicants for Employment Must Have Certain Qualifications to Meet the Standards Set Up by the Watertown Transportation Company—After Breaking In as a Driver a Probation Term of Six Months Is Served Before Being Put on a Regular Run—Promotions Are Made from the Driver's Ranks to Fill Any Vacancy in Maintenance Shop Force**

## How Employees Are Selected and Trained in Watertown

**W**HEN one rides on the buses of the Watertown (N. Y.) Transportation Company, something makes him feel at home, that he is welcome and that he is riding with a responsible driver. A recent visit with Edgar Comstock, the general manager of the company, threw some light on the reasons for this feeling. The answer was none other than the personal interest of Mr. Comstock in the development of the property, the welfare of the men all through the organization, both while on duty and off, the cheeriness of his smile and the sincerity of his actions. All this was reflected in the attitude of the men driving the buses—that their job was not a mere pastime; instead, it is an opportunity to help others in carrying on community activities.

All of the drivers employed are keen-eyed young fellows, sturdy and watchful as to the comfort of their passengers. At the same time, they take pride in their personal appearance, are careful to obey the rules of the road and give pedestrians and other drivers due consideration. They have a pleasing way all their own of carrying out the company's rule: "Be courteous, do not snap back at the passengers, but when a grouchy boards a bus, smile; when one comes on smiling, smile too." In fact, they follow closely the real definition of what a driver should be—careful, courteous and competent.

Watertown is a city of about 32,000 population. It lays claim to having one of the few urban bus operating companies in the country, namely, the Watertown Transportation Company. Originated in August, 1911, by local business men for the sole purpose of keeping the trolley cars off certain residential streets and to furnish local transportation to such sections of the city, it has had an interesting career. It was not, however, until April 16, 1916, that the city of Watertown



*The routes of the Watertown Transportation Company do not conflict with the street car lines.*

granted the company a franchise. This franchise, which is for a twenty-year period, provides for four routes, all of which radiate from the Public Square, as shown on the accompanying map. In operation, however, these four lines follow the riding characteristics of the territory so as to provide two distinct operating routes, each of which has about the same amount of traffic.

While the buses are not of the modern low-level type, nevertheless, even after four years of service, they are in good operating condition, well painted, clean and reasonably well maintained. But one type of bus is used, namely, a G. M. C. 1-ton chassis with longitudinal seats. Each bus has a seating capacity of twelve passengers, but in rush hours often more than an equivalent number of standees are carried. Pneumatic tires are used exclusively.

Much can be told of the way this company has undertaken the serious

side of furnishing transportation, such as the methods employed to keep the equipment in condition and the business side of the undertaking. In general, many of the ideas employed could be copied to advantage by other bus operators. This article, however, will take up only some of the matters relating to furnishing transportation, covering the methods employed in the selection of drivers and what is expected of them, and, finally, how their business are run and the system of paying the fares and the method of collecting fares. The other articles the maintenance and a concluding practice will be described.

### HOW DRIVERS ARE SELECTED

The company has an difficulty in obtaining a sufficient number of men, as the job of bus driver in Watertown is as good if not better than the majority of positions offered to the unskilled worker. It even has a waiting list of applicants,

EMPLOYMENT RECORD D.M.T. 4		WATERTOWN TRANSPORTATION CO. WATERTOWN N. Y.		No.	
NAME		KIND OF WORK		RATE	
ADDRESS				DATE	
WHERE BORN					
AMERICAN CITIZEN YES <input type="checkbox"/> NO <input type="checkbox"/>					
HEIGHT FT. IN. WEIGHT LBS. AGE YEARS					
MARRIED <input type="checkbox"/> SINGLE <input type="checkbox"/> DIVORCED <input type="checkbox"/> WIDOWED <input type="checkbox"/>		CHANGE OF ADDRESS		PHONE	
FATHER <input type="checkbox"/> MOTHER <input type="checkbox"/> RELATIVES <input type="checkbox"/> KEEPS HOUSE <input type="checkbox"/> BOARDER <input type="checkbox"/>					
DEPENDENTS					
LAST EMPLOYER					
LENGTH OF SERVICE					
KIND OF WORK		POSITION TEMPORARY <input type="checkbox"/> PERMANENT <input type="checkbox"/>			
REASON FOR LEAVING		CIVIL SERVICE YES <input type="checkbox"/> NO <input type="checkbox"/>			
		DATE LEAVING OUR EMPLOYMENT			
CAN DO OTHER WORK AS		REASONS			
EDUCATION PUBLIC SCHOOL					
HIGH SCHOOL					
COLLEGE					
DATE EMPLOYED FOR DEPT.		NOTIFY IN CASE OF ACCIDENT			
SIGNATURE OF APPLICANT		ADDRESS		PHONE	
THE ABOVE STATEMENTS ARE TRUE					
NO. NAME					
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31					
STAY TYPING AT 11 USE OTHER POINTS ON SCALE TO STAY OTHER DIVISIONS OF VEHICLE TITLE TO INSURE PERFECT ALIGNMENT OF EACH DIVISION OF INFORMATION					
AMERICAN KAREX CO. INC. TONAWANDA N. Y. U. S. A.					

Route	
Date	
FIRST RUN Meter No.	
Car No.	ON OFF
Cash Reading	Ticket Reading
\$	
SECOND RUN Meter No.	
Car No.	ON OFF
Cash Reading	Ticket Reading
\$	
Name	No
Transfers	

and it is therefore able to make its own selection without taking any one who may later prove to be detrimental to the company's interests.

Applicants to be picked for the position of driver must have at least a public school education and hold a New York State chauffeur's license. They must also be willing to furnish the name of their last employer, the length of time they were there, the kind of work performed and their reason for leaving. The bus company then checks up these statements by letter with the former employer for its own records, and if the investigation proves that the man is of good character and honest, his name is placed on file for future employment as needed. Because the company demands that each applicant be a licensed chauffeur, it is unnecessary to teach him how to drive before putting him out on the line to learn the bus route, the intersecting streets and traffic points. Upon being called for employment, the applicant usually spends two days on each route under the supervision of an inspector, and at the end of the four-day period, if he appears to be proficient in handling the bus and knows fairly well the names of the intersecting streets, the inspector turns him in as being eligible for what is termed the student's list. Reaching this point, the applicant is given the student's driver badge and put on probation for six months "bucking the list"; that is, working when a man is off duty sick or for other reasons.

At the end of the probation period,

*A personnel record card is kept of each employee. At the right is shown the form of driver's daily report for collections made*

if the man's record is good, he is listed as being available for a regular run. There are four students on the probation list at all times. When an opening occurs the one who has the best record is picked to fill the vacancy. In other words, selection is not made by seniority of employment but by personal record of the applicant while on probation.

Applicants while employed as students are paid on the basis of 50 cents per hour for time actually worked. Regular drivers are paid a weekly wage of \$30 and have one day off in seven. This is one of the features of employment that make the job so attractive and keep the turn-over low. In fact, the majority of the twenty-odd drivers on duty today have been with the company for more than five years.

Shop employees are picked from the ranks of the bus drivers. Just how this is done is explained later in this article.

WATERTOWN TRANSPORTATION CO.		Good only on Washington or Franklin St. Busses	
THIS TRANSFER is good only on first bus leaving for destination indicated above, after time punched			
1-2-3-4-5-6-7-8-9-10-11-12		A.M. P.M.	
10-20-30-40-50-0			

*Type of transfer used. Issuing routes are distinguished by colors*

Beginning with July 1, 1922, the regular monthly pay of all employees with the company for six months as regular employees was supplemented by a bonus of \$5. Merits are credited and demerits are debited on the basis of each to this sum. In no case, however, can an employee secure enough merits to increase his bonus beyond \$5 per month, nor can demerits reduce his regular pay. The general manager makes all rewards with the right of review and appeal to the president, whose action is final.

That the system is working well is evidenced by the fact that during its first fourteen months of operation only two drivers have been given demerits.

#### BONUS SYSTEM

Merits may be earned by an act of service to the company which is beyond the duty actually required of an employee or which shows special skill or zeal in the company's interest. Cases may be cited such as a driver getting out of a "tight place" for which he was not responsible; or his avoidance of an accident by the use of courage or judgment; or his preventing or detecting fraud in the payment of fares; a mechanic by making an exceptionally clever piece of repair work or adjustment.

Demerits will be given for failure and inefficiency in fulfilling the requirements expected of an employee. Some of these are specifically mentioned in the following table of offenses:

	First	Second	Third
Missing run or reporting late	1	3	5
Discourtesy to passenger	5	10	10
Driver smoking on duty	1	5	10
Reading on duty	1	5	10
Inattention to duty	1	5	10
Careless driving	5	10	10
Leaving car unprotected	5	10	10
Improper use of brakes	5	10	10
Failure to report accident	10		
Failure to report defect known	5		
Giving out misinformation	5	10	
Criticising policy of management of company except to superiors	10		
Lack of neatness or cleanliness, or improper or untidy dress	2	10	
Violation of motor traffic regulations	5	0	

The following offenses will subject the employee to liability of immediate and summary discharge: Disloyalty to the company; insubordination; discourtesy to passengers; desertion; intemperance; immorality; endangering lives of passengers, public or employees; improper collection or handling of fares.

#### DRIVERS ARE UNIFORMED

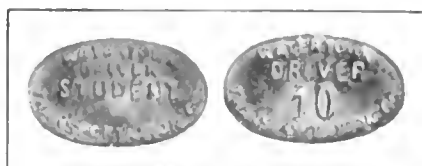
It is one of the company's requirements that the men wear a standard uniform. This consists of a military visored cap, a single-breasted lapelled coat, blue shirt, cotton in summer and flannel in winter, knickers and puttees. Uniforms are purchased by the company at wholesale rates from McCord-Smith Company and sold to the drivers at cost. This is in the neighborhood of \$25. The method of payment is optional—some men pay cash, while in other cases the company deducts an agreed upon amount weekly from the man's wages. Two uniforms per year are generally sufficient. The winter uniform also includes a reefer or hip-length overcoat.

In fact, the company has a plan whereby it loans any employee a reasonable amount of money without interest in case of necessity or emergency, repayment to be made in small weekly installments.

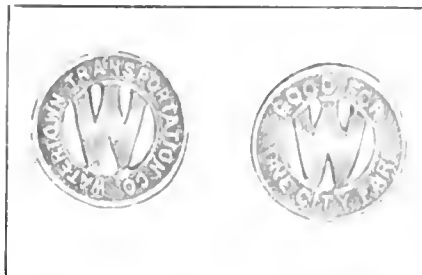
Two types of badges are worn, as illustrated. One is for the student driver and the other for the regular driver. The only apparent difference is that the regular drivers are numbered. A unique method is followed in the wearing of the badges. They are worn at the back of the cap so as to be visible by passengers riding in the buses.

#### PERSONNEL RECORDS AND ACCIDENT REPORTS

When a man goes on duty as a driver, either as a student or a regular, the company provides him with a five-barrel Johnson money changer,



Drivers' badges



Type of metal tickets used

\$5 in change and \$5 worth of four-for-a-quarter metal tickets. He is also provided with a special punch, a pad of 100 transfers, a trip report and a money bag for use in making settlement at the end of the day's work. The company expects and holds him responsible then for having a sufficiently large supply of change and tickets whenever he goes on duty.

In case of accident, no matter how trivial, in which the bus is involved, drivers fill out a special blank, a sample of which is produced herewith. This is one of the requirements of the Globe Indemnity Company, Newark, N. J., the company that carries the liability insurance on the buses.

On the form, as will be noticed, the driver writes the name and address of the injured person, the nature of

the injury, the details as to the accident and its cause. As many names of witnesses as possible are secured to corroborate the report and a claim for damage is made. The form is then turned over to the company's office, where it is noted at the earliest possible moment and the accident so that the liability of the party can be determined at the proper time.

One and the same form is used to report that the driver involved in the Watertown Transportation Company are careful and that their liability operation is borne out by the fact that for the year 1923 the company was able to secure a reduction of the premium rate of about 10 per cent on its insurance policies. This is a pretty good record and the company recognized it through the adoption of a bonus system.

#### SYSTEM OF FARES AND METHOD OF COLLECTION

The local franchise granted in April, 1916, specified that the rates of fare to be charged for a single ride was to be 5 cents, with reduced rate tickets in lots of six-for-a-quarter with free transfer privileges between the different routes. Like many other transportation companies in the country, this company was confronted with rising costs of operation during and following the World War and on Dec. 15, 1921, the city of Watertown agreed to allow the rates of fares to be increased. The cash fare rate was changed to 7 cents and tickets were sold in lots of four for a quarter instead of six as heretofore. The free transfer

<b>The Injured Person</b>		Date _____	
Name _____		Time _____	
Age _____		Place _____	
Sex _____		Occupation _____	
Address _____		City _____	
State _____		Country _____	
Nature of Injury _____		Cause of Injury _____	
<b>The Accident</b>		Date _____	
Time _____		Place _____	
Location of Accident _____		Weather _____	
Condition of Road _____		Condition of Vehicle _____	
How far from the curb? _____		At what speed? _____	
Was anyone on the sidewalk? _____		Was anyone on the street? _____	
Accident caused by _____		If so, by whom? _____	
Was anyone injured? _____		If so, by whom? _____	
Was anyone killed? _____		If so, by whom? _____	

The drivers fill out this form to report accidents.

privileges were, however, maintained between the different routes. The tickets used are made of metal and little smaller than a dime. Fares are collected on the prepayment plan and transfers issued at time fare is paid. To speed up fare collection, all buses are equipped with Johnson registering fare boxes. Some of the fare boxes register in dollars and cents, while others simply count the number of fares collected, that is, in 7-cent units. All boxes, in addition, have what is known as a metal ticket pick-up for counting separately the metal tickets collected. This means that all fares except the free transfers are deposited in the fare box. Drivers make change only. They are

route worked, the date, the number of bus driven and the meter or fare box number. In the space provided the opening numbers of the day of both dials on the fare box are put down on the second line so that when relieved for meals the closing numbers can be put down directly over them. By simple subtraction, then, the driver can tell how much he has taken in. In the bottom half space is provided for collections on the last half of his run. The sum of the two makes the total for the day and represents what must be turned into the company. The number of transfers collected is marked at the bottom. What is commonly called the bag system of settlement is used in

the basis of all records kept by the company, showing revenues, number of passengers carried, transfers picked up, etc., for each individual driver, bus or route, as well as the total for the day's business.

#### SOME OF THE OPERATING RULES

The company has issued a book of rules for its employees, and to insure that the men know them a plan was recently inaugurated of having each rule printed separately, one of which is inserted in the weekly pay envelope as a reminder. This plan is unique and the company believes that it is proving beneficial in keeping the rules fresh in the minds of the men. The rules of the company urge drivers to operate buses more carefully than if they were driving their personal car, for the safety of passengers is in their hands; that buses keep to the right at all times; that the right of way be given to any one coming out of an intersection from the right; that drivers respect the rights of others and not insist upon their own if there is danger in so doing. The slogan of Safety First always must be followed.

Police regulations prohibit passengers from standing between the driver and the door or riding on the steps of the bus. Likewise, the speed limit is 15 m.p.h. and in some parts of the congested section slower.

In picking up passengers buses drive as close to the curb as possible to avoid having passengers step into the street.

Where there are road delays due to mechanical or tire troubles, drivers call for the emergency service wagon. It is a rule of the company never to run on a flat tire as this not only ruins the tire casing but the tube and rim as well.

Dogs and bulky articles are not permitted to be carried, likewise intoxicated people.

Buses on reaching the end of the route must be turned around facing the city center so as to be ready to pull out on schedule time.

In the winter when soft snow is on the ground drivers are told to scatter their tracks in order to pack the snow and form a smooth roadway and eliminate ruts.

In starting all three gears are requested to be used. To start off in second is prohibited.

Bus service is given on each of the routes for practically seventeen hours



*Picking up passengers in the Public Square in Watertown*

not permitted to deposit fares for passengers. There are no deadheads except policemen, firemen and company employees. The number of transfers collected averages but thirty per day and the company has not yet considered it essential that any particular registration be made for this volume of traffic. The driver simply notes on his day card in the space provided for that purpose the number picked up. No record of deadheads carried is kept.

Only simple records of traffic handled are kept by the bus drivers. The policy of the company is to require only enough information to check the money and tickets that have been collected during the day. Each driver fills out a report, a sample of which is illustrated. As will be noticed, this report indicates the

making returns. Under this plan the driver puts his daily report record slip in a bag, along with the money as determined thereby, and deposits it in a safe having a trapdoor at the garage. Once deposited, it is out of reach until the safe is opened. Day men usually turn in their previous day's collections before going to work in the morning, while the night men must do so before taking out their noon relief. Many of them, however, make settlement when pulling in at night. This avoids going to the garage the next day, as all reliefs are made at the Public Square in the heart of the city. In case of errors, either overs or shorts, adjustment is made personally through the office with the man affected.

These daily report slips also form



per day, 6:30 a.m. to 11:40 p.m., with the exception of Sunday, when buses do not pull out until 7 o'clock in the morning and are in at 11 p.m. Ten-minute headway is the standard of service, except during the morning, noon and evening rush hours, when extra trips are put on to take care of the additional traffic.

On the Washington and Franklin Streets route, which is 2½ miles long, the first of the three regular buses on the line pulls out at 6:25 a.m., so as to leave the Washington Street end of the line at 6:30 a.m. The next bus out is 6:45 a.m., while the third does not come on until 7:35. The last bus pulls in at night at 11:40 p.m. and leaves the Public Square at 11:22 p.m. These three buses give a ten-minute headway during the entire day, which means that the time allowed for a one-way trip is fifteen minutes.

#### ROTATING PLAN FOLLOWED IN MAKING RUNS

On the Mill and Arsenal Streets route, which is 2½ miles long, four buses are needed to give a ten-minute service all day. During certain hours, from 7 to 9 a.m., 11 a.m. to 1:30 p.m. and from 5:30 to 9:30 p.m., on stormy days and from Sept. 1 to May 1 three additional buses are put on to give a five-minute headway. The good days, therefore, during the summer months, that is from May 1 to Aug. 31, only three buses operate, the reason being that the summer traffic is far less than in winter, due to better walking conditions and the increased use of the private automobile.

The regular schedule calling for seven buses is made up into fourteen two-piece runs, the actual time of which varies from ten and one-half to twelve and one-half hours on weekdays. On Sundays runs vary from ten to eleven hours. Under the plan of operation the drivers are not on duty these long stretches for a full week, as their work day rotates down the schedule, which provides one day off in seven. For instance, on the Washington-Franklin Streets line the driver working No. 1 run on Monday pulls out at 6:25 a.m., has a meal relief from 11:52 a.m. until 1:03 p.m., then works until 6:03 p.m., a total of ten hours twenty-seven minutes in a spread of eleven hours thirty-nine minutes. On Tuesday he takes run No. 2, which pulls out at 6:45 a.m., has a relief from 12:13 until 6:07 p.m. and pulls in

at 11:40 p.m. In reality he works eleven hours, but it is spread over a period of nearly eighteen hours. The following day, Wednesday, he does not go to work until 11:53 a.m., has a meal relief from 5:23 to 6:13 p.m. and pulls in at 11:20 p.m., working slightly more than eleven hours in a spread of eleven hours thirty minutes. The fourth day, Thursday, he has off. On Friday he pulls out at 6:14 a.m., makes three trips on the Arsenal-Mill Streets route, pulls in at 7:26 a.m., spends the balance of the morning in the shop as a helper, has a meal relief from 11 a.m. until 12:13 p.m. and drives a bus until 6:13 p.m. This run has actual working time of ten hours fifty-six minutes over a spread of twelve hours.



*Driver's position is well located  
to handle passengers*

On Saturday he pulls out at 7:35 a.m., is relieved from 1:03 until 5:23 p.m. and pulls in at 11:30 p.m., making twelve hours 30 minutes work in sixteen hours. On Sunday he pulls out at 7 a.m., works until 11 a.m., lays off until 12 noon and is relieved again at 4 p.m., which makes eight hours work in nine hours. All told, then, the average number of hours worked for the seven days amounts to sixty-four hours, or ten and two-thirds hours per day on the average.

In the case of drivers working trippers on the Washington-Franklin Streets line the runs are in three pieces, the longest of which pulls out at 7:40 a.m., works until 9:15 a.m., lays off until 11:45 a.m., pulls out again at 5:45 p.m. for the evening

rush and pulls in at 10:15 p.m. This run calls for nine hours five minutes work in a spread of fourteen hours thirty five minutes. Drivers who work trippers also follow the rotating plan, so that in six days they work fifty-one hours. Sunday is their day off as no trippers are run.

By having the runs on the rotating plan it is possible to follow what each run ought to turn in from day to day much closer than if the same man worked the same run from day to day. Then, too, no attempt is made to keep the same drivers on a particular bus. Buses are all alike and the garage man simply lays out the buses for each route signed up.

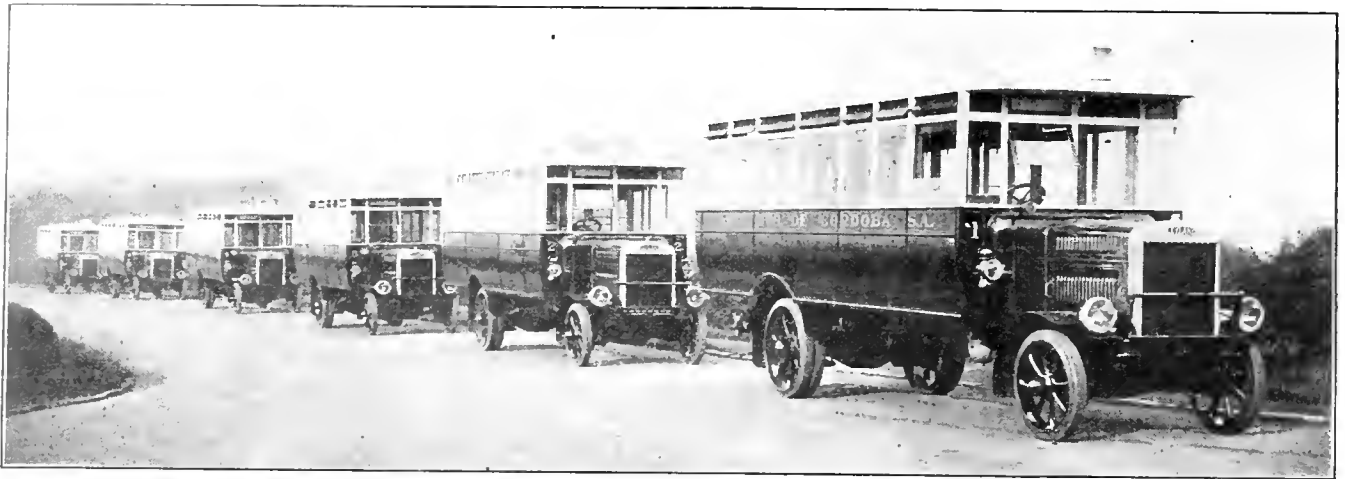
It will be noticed that one of the runs calls for time in the shop. The plan behind this is to give the drivers a training that will fit them for work in the repair shop in case there is a vacancy. In other words, the company trains its own repair men while they are holding drivers' positions. After two years of driving on regular runs, during which time nearly 125 days have been spent in the shop, the company believes it has among its own forces men who are better qualified for shop work than any who are picked up from the street.

#### Colorado Midland Roadbed to Become Great Scenic Highway

A NEW scenic highway route in the Rocky Mountains favorable for bus operation will be opened up soon from Divide to Glenwood Springs, Col., a distance of 260 miles. The highway will be constructed on the roadbed of the abandoned Colorado Midland Railway, the officials of the company having recently presented the roadbed to the state of Colorado. The donation carries with it three trestles, valued at \$150,000, and the Busk-Ivanhoe tunnel, 2½ miles long, 16 ft. wide and 24 ft. high.

The construction of a motor highway from Divide to Glenwood Springs through the tunnel will insure an all-year route over the Continental Divide.

Along this Rocky Mountain road the scenery is most magnificent. With the additional novelty of riding through a 2½-mile tunnel, 11,000 ft. above the sea, it is expected that several new scenic tour bus lines will soon be organized.



*Leyland thirty-seater for ancient Spanish city of Cordoba*

## British Develop Large Single-Deckers

THE accompanying illustrations show the floor plan and exterior of a forty-seater and a group of six thirty-seat single-deck buses, both designed by the Leyland Motors, Ltd., Lancashire, England.

The principal feature of the Crossville bus is the large seating accommodation provided on one deck, without excessive over-all length. The chassis is the standard Leyland type, 4-ton capacity with a slightly longer wheelbase. Steering and

driver's control are arranged at the side of the engine, to give additional passenger space. There are three entrances, all on the left-hand side. The central aisle runs down the middle of the bus between the two rear entrances, so that passengers can enter by the front door and leave by the one at the rear. The chassis is designed so that engine, clutch and transmission can be taken out without removing the body.

The group picture represents six

Leyland single deckers for the Auto Bus de Cordoba, Spain. These chassis are of the R.A.F. reconditioned type, with extended frames and increased wheelbase. The bodies seat thirty passengers comfortably. Front and rear doors are provided, so that one can be used as an entrance and the other for exit.

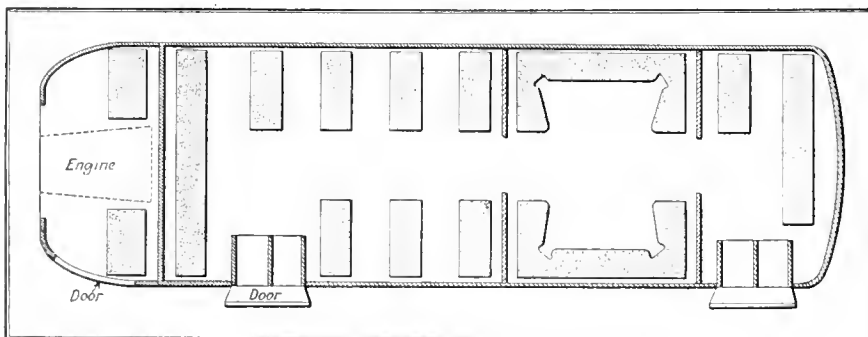
All passenger service doors are on the left-hand side, because of the English "turn to the left" rule of the road.

## Common Sense on the Highway

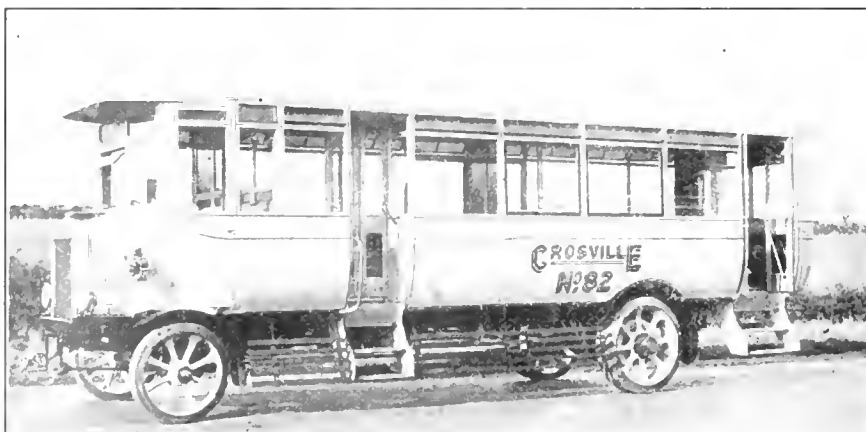
THE National Automobile Chamber of Commerce, through its motor truck committee, has issued a booklet advocating courtesy on the highways, sharing the road with others and its use generally by operators of heavy-duty vehicles, so as to make friends rather than enemies among the drivers and passengers of so-called pleasure cars.

Here are seven points that the booklet says every driver of heavy-duty vehicles will do well to remember:

1. You are an engineer with a definite responsibility.
2. You control a highly concentrated piece of machinery.
3. A valuable cargo has temporarily been placed under your care.
4. In your hands is an investment of many thousands of dollars.
5. You are operating over a finely built highway—your highway—you have one share.
6. But—don't forget that the man in the car behind also has a share in it.
7. There may be ten cars behind you—ten shareholders. Is it to be friend or foe? You alone can decide.



*Seat plan of Leyland forty-passenger bus*



*English single-decker, seats for forty inside. One door for driver, two for passengers, all on left-hand side*



*Type "Z" coach of the Chicago Motor Coach Company*

## New Sixty-nine-Passenger Double-Decker Installed in Chicago

Four-Wheel Brakes, Rigid Frame and Sleeve-Valve Engine Are Features of New Bus Developed by the Yellow Coach Manufacturing Company

THE Chicago Motor Coach Company, through its subsidiary, the Yellow Coach Manufacturing Company, has undertaken something never before attempted in the automotive industry. Manufacturers of automobiles and trucks usually require not less than two years in which to design, develop and perfect a new unit. However, this company, since last November, has designed, developed and perfected three new types of coaches. In this accomplishment the Yellow Coach Manufacturing Company has given to the Chicago Motor Coach Company and to outside users of its vehicles a coach which embodies in mechanical detail, in appearance and in riding quality the latest features in automotive practice.

The first of 600 new double-deck buses has been placed in service, and the Chicago Motor Coach Company will add to its equipment at the rate of one bus a day, later adding five a day as facilities are

increased at the Yellow Coach Manufacturing Company's plant, maker of the new buses. The chassis of the new vehicle is known as type "Z." It is capable of accommodating three body designs, two of the double-deck type and one of the single-deck type. The sixty-nine-passenger double-deck design shown in the accompanying photographs is the type being produced in quantity for the Chicago Motor Coach Company.

The chassis and body designs were formulated after months of research and study. No feature of recognized practice was taken in its entirety, each detail being the company's own design. In the assembled finished product members and parts were tested and further strengthened wherever the theoretical design failed in practice. The accompanying drawings indicate how this method has been carried out, giving the chassis a large factor of safety. The chassis, which has a channel

side frame of 10 in. x 4 in. x 1 in. maximum section, with a kick up over the rear axle, is so constructed that twisting is practically impossible. Five cross members, two of 2½ in., one of 3 in. and two of 1 in. diameter, all of ¼-in. thick steel tubing, take up all the torsion effect in the frame; the ends are brazed into steel castings, which in turn are riveted into the side frames. A stabilizing member of channel section is fitted at the rear end of the rear spring, this being attached to the frame by means of large gusset plates.

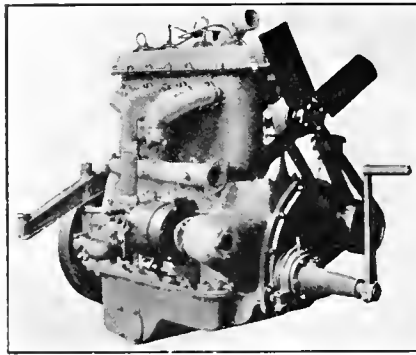
Before arriving at this type of frame considerable calculating and experimenting was conducted to determine just how to eliminate the usual practice whereby the strain of distortion is placed on the body. During one of these tests a body mounted on a frame without tubular cross members was subjected to distortion, with the result that every window was broken. After the tubu-

lar cross members were installed, it was found that one entire end of the frame could be raised by lifting either corner at that end. The rigidity factor which had previously been furnished by heavy construction in the body is now incorporated in the frame with little additional weight. A much greater body life will be the result, it is expected, with a minimum maintenance charge.

A ride in the new coach further strengthens the opinion that the design and achievement of the engineers have produced a product of exceptional riding ability. Acceleration is accomplished in a very smooth, progressive manner, without jerking, while deceleration produced by the four-wheel brakes gives one the sensation of gentle stopping without the feeling that one must be braced against the seat in front.

The interior of the coach presents an artistic, appealing appearance with the enameled white ceiling, the rattan seats and side walls and the artistic, serviceable hardware of polished aluminum. Body rumbling or other noises have been eliminated almost entirely. Window rattle, for example, has been avoided by the insertion of polished glass in brass sash. The construction is such that the windows are held securely to the body frame.

The power plant is a new design made by the Yellow Sleeve-Valve Engine Company. This plant was bought recently by the makers of the



*Knight sleeve-valve engine, with generator in saddle*

coach, so that an engine with the necessary qualities of power, efficiency and silence would be available.

A three-point suspension for the engine is used. At the front is a heavy 5-in. bearing, supported on a channel cross member, while the two points at the rear are underslung to a drop-forged cross member. Long bolts hold the engine in place against this cross member. A single plate, dry disk clutch, held engaged by twenty cylindrical compression springs, is mounted directly in the flywheel. With the special built Zenith carburetor a gland is provided to prevent air leakage at the throttle lever. A feature of the manifold is the hot spot, by which the exhaust gases are played upon the intake manifold, vaporizing largely all of the fuel.

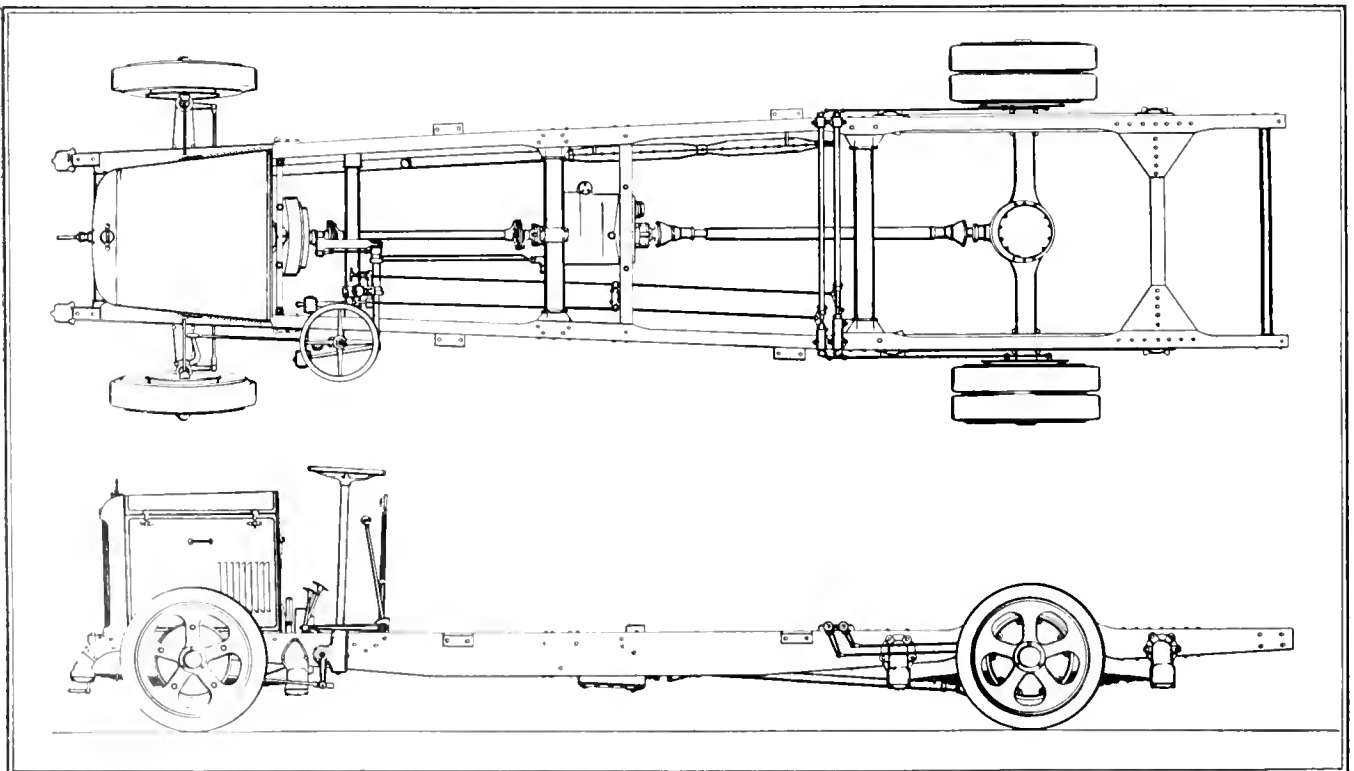
*Chassis in plan and elevation*

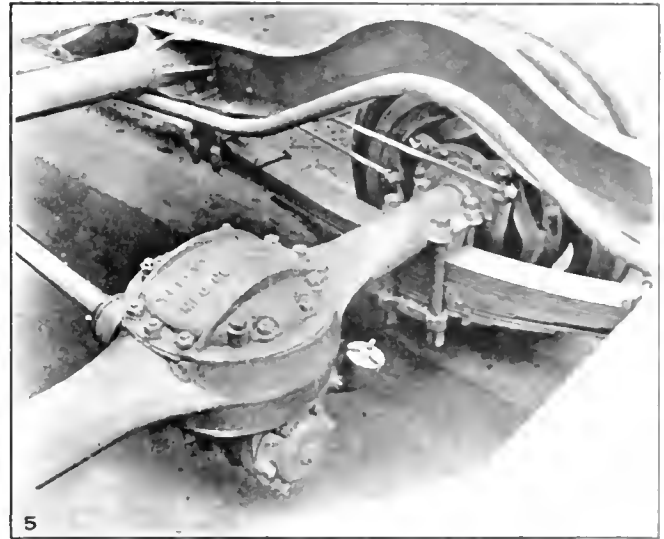
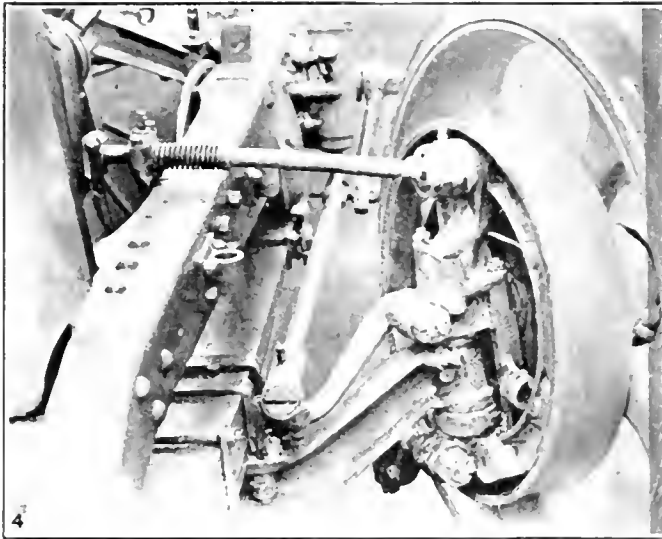
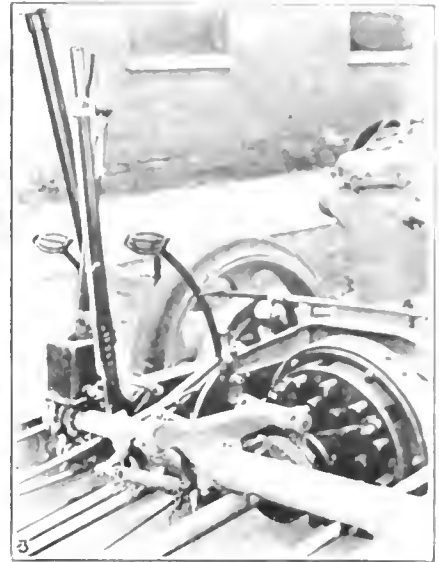
The engine has four cylinders, 4-in. bore, 6-in. stroke, developing a brake horsepower of 55 at 1,800 r.p.m. A 3-in. crankshaft forms ample bearing surface for the main and connecting-rod bearings. Force feed lubrication system supplies oil to these and the eccentric shaft bearings. The crankcase oil-joint faces are 1½ in. wide, with bolts spaced on 3½-in. centers. With this construction and a special oil-retaining device at the flywheel oil leakage is practically eliminated.

A four-blade fan driven by a 2-in. belt from the eccentric shaft runs at one and one-half times the engine speed. This fan is mounted on a tubular bracket with an internal spring which forces the fan spindle up, increasing the belt tension. Merely loosening and tightening the clamp bolt adjusts the belt tension.

The controls are mounted directly behind the engine on a 3-in. tubular member. They are of the selective type with very accessible levers and pedals. All movable joints have spherical bearings, while the fixed joints between shafts and levers have serrations on the shaft and split clamps with bolts on the lever. This design of joint is standard for the control mechanism, and also for every other detail where fixed and movable joints are necessary.

The standard transmission equipment on this type of coach is the three-speed silent chain type, spe-





cially designed for service where the grade is not severe and where a total absence of noise is essential. To prevent transmission driving dogs coming out of mesh a plunger lock mechanism is employed. The transmission cover is located on the underside, thus permitting easy inspection. In fact, the mechanical features are laid out for pit inspection, both to facilitate the work and so greasy mechanics need not enter the body. The rear axle is of the semi-floating type with an underslung worm and wheel. The rear housing is a one-piece drop forging, heat treated, with integral spring pads. This drop forging is bored out from end to end to accommodate the driving axles, which are tubular to reduce the weight of the rear end and at the same time insure ample strength. Carrier, differential, worm, worm-wheel and bearings all form an integral unit with exact registration in the housing member. Side thrust from the worm is taken directly

*No. 1. Engine and controls mounted in chassis*

*No. 2. Front wheel brakes, and aluminum radiator shell*

*No. 3. Controls mounted on tubular cross member*

*No. 4. Front wheel mechanically operated brake*

*No. 5. Rear axle housing, with progressive springs, underslung*

against the bore of the banjo. For maintenance, replacement or inspection this unit can be removed.

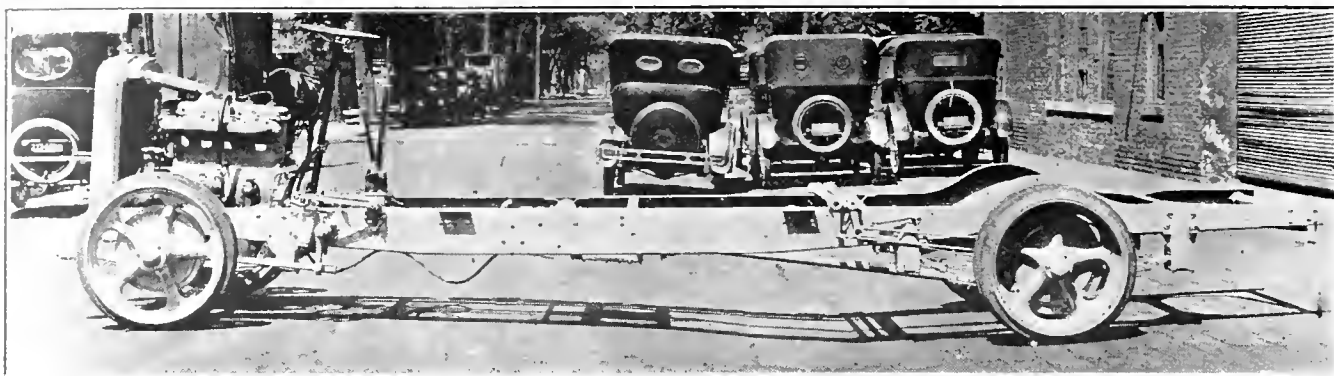
Of the three sets of brakes, two operate on the rear wheels and one on the front wheels. The pedal connects to internal brakes on both front and rear wheels, while the second set of rear wheel brakes (external type) is actuated by a lever of the push-on type. Rear wheel brake drums are 21 in. in diameter and 5 in. wide. Front brake drums are 18 in. diameter and 3 in. wide. These give a total effective braking surface of 774 sq. in.

One of the features of the braking apparatus is the ease of adjustment from the driver's seated position. In the floorboard is a hinged plate; on opening this the operator can reach the adjusting levers, which may be moved without any tool equipment.

Both the front and rear springs are of the progressive type, giving what is known as 100 per cent progression. Under normal loading the springs are practically flat. Rubber shock insulators, which require no lubrication, are employed in place of shackles and shackle bolts. These have the advantage, it is said, of preventing squeaks and rattles, of providing riding comfort, and of almost entirely eliminating spring breakage. The rear springs measure 62 in. long and 1 in. wide; those on front are 50 in. long and 3 in. wide.

The front axle is of the reverse Elliott type, with wheel loads taken on especially designed thrust races. Each race is equipped with twenty in. balls. The size of these thrust





*Clean appearance of chassis a feature of type "Z" design*

bearings assist materially in securing easy steering, as does also the fact that the distance between the center line of the tires and the center line of the pivot pins has been kept down to a minimum. Other steering parts include a worm type reduction gear mounted outside the frame, a hand wheel, 18-in. diameter, fore and aft steering linkage, and a straight drag link.

Single 34-in. x 5-in. solid or 34-in. x 6-in. semi-pneumatic tires are used on the front, with duals of the same size on the rear.

The general dimensions of the type "Z" chassis and body are given in the accompanying table.

The body construction is of second growth, thoroughly seasoned ash, securely braced and joined. All joints are sealed with white lead and screwed or bolted into place. Lower-deck and stairway panels are sheet steel, treated to prevent rust, with panels firmly screwed and fastened and all edges covered with metal or wood molding rabbited into the framework. Upper-deck panels are  $\frac{1}{4}$ -in. "Haskelite," so applied that no edges are exposed to the weather.

The lower deck accommodates twenty-eight passengers, all facing forward on seats 34 $\frac{1}{2}$ -in. wide and spaced on 28 to 31-in. centers. The seats are full spring cushions, with backs covered with rattan. The upper deck accommodates thirty-nine passengers. These face forward except for one individual seat at the head of the stairway, which faces sideways. Seats are of flat wood type finished in natural wood, 35 in. wide, with a hand grip at the aisle corner, and are spaced 27 in. apart. Aisle widths are 18 $\frac{1}{2}$  in. and 18 in. for upper and lower decks respectively.

The stairway is of the spiral type, 17 in. wide. There are eight steps, with a 10-in. rise per step. A feature is the space provided for the rear platform, it being 45 in. long and 70 in. wide. The surface is covered with an anti-skid mat. Grab handles are located for use in boarding or alighting, although the platform is only 14 $\frac{1}{2}$  in. from the ground.

Constructed of 2-in. wide tongued

and grooved pine, the roof is braced at each body post with ash gun-stock carlins. On top is a heavy waterproof canvas, and above that closely spaced maple slats. These are laid diagonally across and secured in position by brass screws. This construction, combined with the cambered roof, makes a watertight structure of extreme strength.

Inside the lower deck there are eight 21-cp., 12-volt nitrogen-filled

#### Dimensions of Chassis and Body

Over-all length, starting handle to rear end of frame.....	23 ft. 7 in.
Over-all length, dash to rear end of frame .....	19 ft. 6 in.
Wheelbase .....	16 ft.
Front wheel gage .....	5 ft. 11 in.
Rear wheel gage.....	6 ft. 1 $\frac{1}{2}$ in.
Height of frame to ground.....	1 ft. 11 $\frac{1}{2}$ in.
Width over front hub caps.....	7 ft. 3 $\frac{1}{2}$ in.
Width over rear hub caps.....	7 ft. 5 $\frac{1}{2}$ in.
Turning radius .....	34 ft.
Weight of chassis .....	6,784 lb.
Weight of chassis per person.....	98 lb.
Over-all length, dash to rear.....	19 ft. 7 $\frac{1}{2}$ in.
Over-all length complete vehicle.....	27 ft. 6 in.
Length of upper deck.....	23 ft. 6 $\frac{1}{2}$ in.
Over-all width .....	7 ft. 10 in.
Over-all height, ground to top rail .....	10 ft. 7 $\frac{1}{2}$ in.
Head room, lower deck.....	6 ft. 1 $\frac{1}{2}$ in.

lamps, so arranged that the light is thrown directly over the seats. These lights are self-contained in the upper half of the advertising racks and are removable as a unit.

Front illumination for city driving consists of two flush-type lights, of 21 cp., set in the dash. On each seat, of upper and lower decks, is a buzzer-button connected with the 12-volt light-bell system for both the driver and conductor.

Exhaust gas is used for heating the body, being carried around both sides through a thin walled steel tubing. All parts of the tubing are guarded to prevent damage to the passengers' persons or clothing. A control valve is located inside the body, where it can be operated by the conductor. Ventilation is provided by louvers with a sliding adjustment, each one individually operated. There are fourteen of these, so that the air within the bus can be changed every ten minutes.



*Lower deck showing rattan seats and brass window sash*



Rules and Forms Prescribed for Making Application for Certificates of Convenience and Necessity and Publication of Notice in Territory to Be Served—Special Taxes to Cover Expense of Administration and Enforcement and for Highway Maintenance Must Be Paid and Liability Insurance Policies Filed Covering Passengers and Property Before Certificate of Convenience Is Granted

## Ohio Commission Issues Bus Regulations Under Freeman-Collister Act

OHIO'S new rules and regulations governing bus transportation, promulgated by the Public Utilities Commission as provided for by the Freeman-Collister bill, went into effect July 28. Even though the process of enforcement is still in its initial stage, bus operation in Ohio is rapidly being put on a sound basis.

The Ohio code has caused much comment in bus circles everywhere and promises to furnish a basis for similar regulation in other states. A brief digest of the rulings is presented herewith.

First of all, no motor transportation concern, either freight or passenger, can operate vehicles in Ohio without a certificate of convenience and necessity from the State Public Utilities Commission, and the commission means to be thoroughly informed as to the details of a proposed bus project before it grants the certificate to operate. Here is some of the information which must be included in every application to operate within the state. Application and exhibits must be filed in duplicate. There must be:

(a) A statement showing the principal office or place of business and residence of the proposed motor transportation company.

(b) Full information concerning the physical property used or to be used by the company.

(c) Complete statement of the route over which the applicant desires to operate, showing the number of miles of the route in each municipality and county and the names of the streets and highways over which the route runs or extends, if the proposed operation is between fixed points or over a regular route.

(d) The proposed time schedules of the applicant.

(e) The proposed tariff schedules showing the passenger or freight rates to be charged between the several points.

(f) Statement showing the stand or location from which and the territory within which the applicant desires to operate when the service is not between fixed points over a regular route.

(g) A blue print, or suitable sketch map, showing the highways and public

places upon which the applicant desires to operate, and the miles of route or fraction thereof in each municipality or county.

(h) Copy of partnership agreement if more than one person is interested.

(i) Statement showing names and addresses of all firms, persons or corporations now furnishing similar service by means of motor vehicles, steam or electric railways, or boat lines, between any of the points or along any portion of the route proposed to be served.

(j) A complete statement showing the conditions existing which are relied upon by the applicant as justification for the granting of a certificate.

In the case of a company actually operating in good faith prior to April 28, 1923, the commission will grant a certificate of operation providing the company files with it an affidavit setting forth the information required of new applicants. In addition it must file the insurance liability policies required under the law. Upon payment of the special license fees hereinafter mentioned the company may continue to operate and shall be governed in all respects as if such company had made a written application.

New companies having presented an application to the commission, they must publish notices of the action once a week for the three weeks prior to the day set for the hearing in a newspaper of the county seat of every county in which operation is proposed. Proof of the publication must be submitted to the commission in the form of a sworn statement, giving the dates and the names of the newspapers in which the notices appeared. A copy of the published notice must also be attached to the declaration.

### SPECIAL TAXES

If the applicant is granted a certificate of convenience and necessity by the commission there is a special license tax to be paid on the date of issuance and annually thereafter on or between Jan. 1 and 15 to defray the expense of regulation and maintenance of the highways.

The tax is levied on each passenger-carrying motor vehicle to be operated and is figured from the beginning of the nearest quarter. The tax schedule for a year is given in the accompanying table:

Seating Capacity of Vehicle and under	When Operated Over	
	Boards	Highways
7 and under	\$4.00	\$2.00
8 to 12	6.00	3.00
13 to 18	14.00	6.00
19 to 24	18.00	11.00
Over 24	20.00	14.00

For vehicles used only for freight purposes only the tax is \$3.00 per year.

For each motor vehicle transporting both persons and property simultaneously, the tax is computed on the basis of either tonnage or passenger capacity and the basis yielding the most revenue applies.

### LIABILITY INSURANCE AND ACCIDENTS

Companies are given five days after the date on which their certificates of convenience and necessity have been issued to file with the commission liability and property damage insurance policies or surety bonds properly indorsed covering each vehicle used. The insurance schedule runs as follows:

Seating Capacity of Vehicle	For All Other Property	For All Property Injured by or Act of Negligence
7 and under	\$5.00	\$12.00
8 to 12	6.00	18.00
13 to 18	6.00	24.00
19 to 24	6.00	30.00
Over 24	6.00	36.00

The policy must also cover \$1,000 for injury to the property of any person other than the assured, such policies or bonds to be written so they cannot be canceled except on ten days written notice to the commission.

Accidents must be reported at once to the commission if the result is injury to any person, or if they result in a property damage exceeding \$270. The report must be in writing and must include the time and place of the accident, the names and addresses of the owners, drivers or

operators of all vehicles involved, the state license plate number, make and type of all vehicles involved, the certificate number of the route on which the accident occurred, the number of passengers in each vehicle involved, the names and addresses of all persons killed or injured, and a complete report of the accident, cause, party or parties responsible, condition of roads, weather conditions and speed of vehicles involved.

#### INFORMATION TO BE KEPT ON FILE

The commission has ruled that any bus line granted a certificate must keep on file certain information in their offices ready for inspection at any time by the commission. First, there must be a daily record of vehicles used showing a complete description of each vehicle and also the number of trips made, and between what points each of the vehicles was operated.

In the case of motor vehicles operated over irregular routes without definite termini a sworn statement must be rendered to the commission five days after the end of each month covering the preceding month's operations. Such a statement must show the number of trips made and between what points, the total mileage operated over within each municipality and the total mileage operated over within each county outside the limits of any municipality.

If any motor vehicle is substituted or replaced by another, a report must be made to the commission in writing fully describing each vehicle to be used and the reasons for the change.

#### TIME SCHEDULES

In the matter of time schedules, the commission intends to keep a strict watch to see that bus lines run on definite time, as witness the following rules:

Application for a certificate must be accompanied by two copies of a working time schedule. They must be mimeographed or printed on letter size paper of good quality and must show the time of departure and arrival from and at all termini, the time of departure from intermediate points between termini, the distance between all points shown in the schedule and to what points on the route service cannot be rendered, and the reasons therefor.

At least one copy of the schedule must be posted in a conspicuous place at each regular stop on the route,

and every driver must carry one with him at all times when on duty.

If changes are made, the new time schedule issued must clearly show them, and a copy of the new schedule must be posted publicly at each place affected at least thirty days before the changes become effective. In addition two copies of the schedule must be filed at the office of the commission.

All interruptions in regular service which are likely to continue for more than twenty-four hours must be reported in writing to the commission and to the public along the route, with a full statement of the cause of the interruption and its possible duration. No company can discontinue service without the permission of the commission.

#### TARIFF SCHEDULES

In regard to rates, the commission has ruled that each bus company when applying for a certificate must present two copies of the schedule naming rates to be charged on the line. After operation has begun, copies of this schedule must be posted in each bus and at places used for loading or unloading en route. The published rates must be adhered to strictly.

#### EQUIPMENT OF MOTOR VEHICLES

The commission reserves the right to inspect any motor vehicle used on a licensed line at any time, anywhere.

All buses must be equipped with lights adequately to illuminate the interior. They must be equipped with a standard speedometer, a suitable heating system, skid chains for rear wheels, good brakes and a horn or signal of some kind.

Buses must have exits at the side and rear. Doors must open outwardly and unlock from the inside. Two red flags or red flash lights must be carried for flagging approaching trains when in danger at railroad crossings.

#### RULES GOVERNING DRIVERS

Every motor bus driver in Ohio, under the new regulations, must be an American citizen, twenty-one years of age and of good moral character. In order to drive he is required to have a chauffeur's license from the office of the Secretary of State. He must not drink intoxicating liquor during the time he is on duty, or at any time use intoxicating liquor to excess, nor may he smoke while driving.

Passengers are not allowed to ride

on the running board, fender, platform, engine hood or any other outside portion of the bus. Drivers operating buses must bring them to a full stop not more than 75 ft. from the tracks before crossing a steam or electric interurban railway, look in each direction for approaching trains and, if certain that none are coming, cross the track on not higher than the second gear in the case of progressive type transmissions or low gear in the case of planetary transmissions.

Operating rules cover the transfer of passengers en route to other buses holding certificates in case of breakdowns. Payment for handling this traffic is to be made by the company whose vehicle is delayed on the basis of distance hauled.

In cases of emergency or unusual demands for transportation additional vehicles can be operated under a certificate for a limited period providing the commission is notified in writing within three days. The necessary fees must accompany the notification. Where new vehicles are substituted for older types a full description must be filed with the commission and reasons for substitution stated.

Where substitution is made on account of needed repairs and larger vehicles are used the carrying capacity is limited to that of the smaller vehicle.

All motor vehicles covered by insurance or surety bond are to be properly marked with the letters P. U. C. O., followed by the certificate number.

#### MUST FILE ANNUAL REPORTS

An accurate record of all receipts and expenditures of the company must be kept and whatever information the commission desires relative to the record must be given once a year at a time to be set by the commission.

The penalty for violation of the code is a fine not exceeding \$1,000, or imprisonment in the county jail for a term not exceeding one year, or both.

### Buses in Syria

THREE bus lines are now being operated between Damascus and Beirut, Syria. One of these is being managed by a railroad company which has a rail line running between these points. There are also bus lines between Damascus and two other cities.



*Twenty-passenger stage on Cadillac chassis. Built by the A. Meuser Sons Company, Sacramento, Cal.*

## Cadillac Chassis Becomes Twenty-Passenger Stage

**California Operator Secures Road Clearance by Drive Shaft Carried in Housing Passing Through Vehicle Body—Wheels of Wood Disk Type**

**V**ALLENTI & STEURMER have recently taken delivery of their fifth rebuilt Cadillac stage, for operation on the line between Sonoma and San Rafael, Cal. The latter is in the territory north of San Francisco. Fares charged are 3 cents a mile over the 25 mile route.

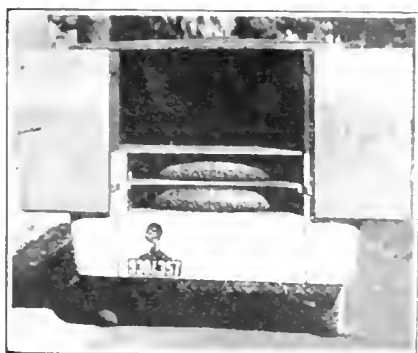
The floor of the rebuilt job is only

17 in. above the ground. It is narrower than many of the stages now operated in California, since the standard passenger-car gage has of course been retained. Spiral bevel rear axle has also been retained, to get good road clearance. It has been necessary therefore to place the drive-shaft in a housing that projects slightly above the vehicle floor, the engine and rear end being kept in the normal position.

The total weight of the vehicle with its 238-in. wheelbase is given as about 5,300 lb. With this a turning circle of 60 ft. is secured. Wood disk wheels have been installed front

and rear, with 36x6 pneumatic tires.

An interesting feature of the body design is the location of the rear seat, in front of the axle. At the extreme rear is a compartment in which two tires may be carried and also light baggage. There are individual doors on the right-hand side, but on the left there is one door only, opposite the driver's seat. The interior is lighted by four dome fixtures. Ceiling is finished in brown Spanish leather. Side panels are 20-gage steel. Roof is covered with Neverleak material, and has two ven-



*Below, seat arrangement and interior of Vallenti & Steurmer stage. At right, driver's sign mounted on top. At left, compartment for tires and baggage.*



tilators. The floor is level with the running board, making for easy access of passengers. Inside the headroom is 66 in. and the width at the top of the seats is 72 in. The main passenger doors are 30 in. wide.

### Down to Earth with Doughnut Tires

WHEN S. V. Woods, manager of the Randolph - Jamestown (N. Y.) Bus Company recently had the rear wheels of his 1-ton Brockway "E" chassis rebuilt to take doughnut tires he did two things. First, he increased the tire width and thus the carrying capacity, which was badly needed; second, he cut down rear tire diameters, and thus lowered the vehicle floor with greater comfort for passengers.

Formerly 33 x 5 tires were used on the rear wheels, but these were not large enough for the sixteen-passenger Cutting body, which weighed 2,700 lb. Several different makes of tires were tried, but as standees are carried to a considerable extent the tire life was very poor.

To increase the tire diameter, retaining the 24-in. rim, meant raising the floor height, center of gravity, and also increasing the unsprung weight on the rear axle. All this was avoided by the use of 32 x 6 Goodrich tires of the doughnut type, with 20-in. rims.

At a cost of only \$65 plus a few dollars for express charges, the old wheels were cut down by a Buffalo repairman, new felloes were put on, rims mounted for the new tires, and one spare rim furnished. It was not found necessary to make any change in the wheel bearings, brakes, drums or gearing. Mr. Woods suggests, however, that in some cases the increased width of felloe might require offsetting of the brake parts.

In operation no difference can be noticed in the speed or power of the bus because of the use of smaller tires. The cost of tires has increased from about \$50 for the small tires to a little more than \$80 for the new ones, whereas the mileage has been increased four or five times. The small tires lasted only about 2,000 miles, but with the 32 x 6 tires Mr. Woods gets 8,000 to 10,000 miles.

So far only one set of the 6-in. tires has been worn out, but if the figures given are not justified by further experience, oversize doughnuts, 34 x 7, can be installed without further wheel changes.

## Bright Future for Bus Business in West Virginia

Recent Study Throughout the State Shows a Wide Use of the Touring Car Rather than the Bus, but Prospective Road Improvements Will Help on Intercity Lines

By "Spectator"

MY RECENT observation of the buses in West Virginia convinces me that the business can be made more profitable if bus men will take advantage of their opportunities. It might appear that on account of the mountainous nature of the country it would not be practicable to operate at a profit, but this is not so. The state is rich in natural resources which are now only partially developed. Their future development would be encouraged by good bus transportation. Moreover, the railways are not giving service in many counties, furnishing the opportunity for a large and profitable business.

Another factor which appeals to me is that the state will spend vast sums for good roads, providing several main highways across the state, besides connecting the county seats with good roads. Bus men should make the most of the opportunity.

There are, to be sure, various classes of bus enterprises now in operation, from the corporation using a fleet of buses on a short haul at a minimum of fare, to one covering long runs of say 100 miles with high-class touring cars at a rate of \$5 per passenger. A large percentage of the business is now handled by touring cars of the better class, in spite of the demonstrated fact that transportation by means of touring cars is the most expensive in use.

The reason for the use of few buses in comparison with touring cars that has been given is that, as the roads are now in poor condition, with sharp turns and steep grades, the touring car is the more practical vehicle. As I have stated, however, this situation will soon be a thing of the past.

In Wheeling one finds the Ultimate Bus Line covering a distance of about 5 miles over two routes. It sells tickets that give the passenger a through ride to the terminal at a cost of 3½ cents. This rate, as judged by applying operating costs in other cities, is too low for a profit. From Wheeling, the Red Star Line

operates a 50-mile route in Ohio, connecting with Columbus lines. Buses are operated over this route for a distance of about 20 miles, but the through business is handled by rebuilt touring cars that have a seating capacity of ten passengers. The line is operated on a fast schedule, which is a time saver when going to Columbus. The line is incorporated and recent reports indicate that it is in a very prosperous condition.

Parkersburg offers some real opportunities for bus transportation, but the business has not made the progress that has been made in other sections of the state. Huntington, however, appears to be awake to the possibilities of bus transportation. Excellent service is given over a route 10 miles in length between Kenova and Huntington. This service furnishes connections with all trains, day and night. A line has recently been opened up between Huntington and Charleston, over one of the new main highways, a distance of 60 miles. Frequent service is given between these cities, with an elapsed time of not more than three hours and over an exceptionally good road. The operators of this line are live and energetic and show themselves open to any suggestions that will improve their service.

Charleston is another city where there are splendid opportunities for promoting bus transportation. This would be a great asset to the city, but, as a whole, the business is in a primitive stage. There are, to be sure, many cars of the touring type used in the transportation of passengers, operated in three or four groups and covering short distances. In these groups the cars are operated by the owners. As stated previously, this class of transportation is the most expensive to furnish and offers the least profit. There are no buses in operation in the city and the field should prove attractive to a real manager and organizer. There are also several routes where longer runs could be developed into a live business proposition. The

There are eight or nine lines operating from Beckley in all directions, two of which connect with the Virginian Railway at different points. On only three of these lines are buses used. The bus business is really well started at this point but the owners are nearly all operating at the maximum cost and few of them keep any cost records or have any system of fare collection or accounting, a procedure which has proved disastrous in other localities.

From Beckley one can travel to Bluefield by a bus line, a distance of 68 miles over a typical mountain road, only partly improved, but the line is not operated in winter. This line saves about twelve hours over the rail route.

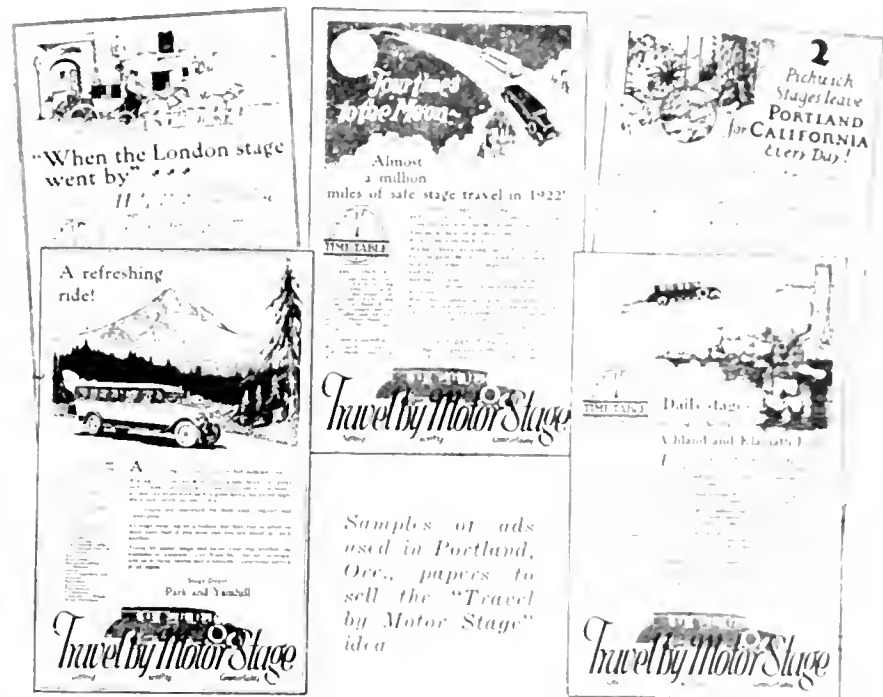
Touring cars are in use on all the lines operating out of Bluefield excepting those of the Pocahontas Transportation Company, which operate from this city to Pocahontas and other points. This is the best systematized line in the state. A description of it will appear soon in BUS TRANSPORTATION.

Going from Charleston to the northern part of the state, one finds the Red Bird Line operating from Clendenin to Spencer, a distance of 30 miles, with touring cars. This line has no fare collection system and keeps no cost or other records. Advertising and package delivery would add conspicuously to the revenue of this line, as well as some of those already mentioned. In the section of the state including Clarksburg, Fairmont and Morgantown, more buses are used than in other sections and commendable progress in

the automotive transportation business has been made, although the fare collection and cost records have not by any means yet reached the stage of perfection.

One line in Morgantown, operating ten buses, is getting some results in maintenance and operation by a system of inspection and real attention to shop work.

## Advertising "Travel by Motor Stage" Pays Well in Portland, Ore.



AN ADVERTISING campaign to acquaint the public with the safety, speed and comfort of travel by motor stage is being conducted by the stage companies running out of the union stage depot in Portland, Ore., and functioning jointly as the Oregon Auto Stage Terminal Co. Business this year is more than 50 per cent better than last year, and of this increment a considerable share is attributed to the advertisements run in Portland daily papers.

Funds for this advertising are assessed on each line in proportion to the volume of its business through the terminal. That is, 2 per cent of the revenue from ticket sales at the depot is deducted for advertising purposes before the receipts are turned over to the individual lines. The money thus provided is used in ads run once a week in each of the two leading dailies, the space used each time being three columns wide by 10 in. high. Of late the 2 per cent has afforded \$600 to \$700 per month for this advertising campaign.

In each of these ads the words

"Travel by Motor Stage, Safely, Swiftly, Comfortably" are always featured, and thus, by frequent repetition, the idea is impressed upon the public. Even if the body of each ad is not read the outdoor picture and the motto, like a trademark, at the bottom of the ad, almost unconsciously have an effect and the object of the ad is attained.

The reading matter in the ads is varied each week, as is the picture at the top, and in successive weeks the several different routes are each featured in turn. The general make-up of each ad is an attractive picture of some outdoor point reached by the particular stage line being advertised, a short commentary in bold-faced type on the convenient and pleasant features of the ride, with special emphasis on the "clean, refreshing trip" idea and concluding with the "Travel by Motor Stage" motto. This motto, by the way, is always printed in the same type and is backed by a modern motor stage in silhouette. These ads have a great appeal, particularly during the summer outdoor season.

# BUS TRANSPORTATION

Published by McGraw-Hill Company, Inc.

CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, September, 1923

## *The Bus Handles Transportation*

**S**INCE Aug. 1, when trolley service through New Jersey was discontinued, the motor bus under individual ownership and line management has had the first real chance to show its ability to handle mass transportation. The bus is doing a good job, at least during the normal hours of the day; during the rush hours, conditions have been somewhat different. At the heavier loading points such as the Newark Tube station and the Camden ferry terminal, passengers have had to wait unduly or have had to fight for a few inches of standing space. There have not been enough buses to care for the crowds unloaded from eight-car trains and double-deck ferry boats, and those on hand have not always been used to the best advantage.

A change for the better was noticed during the month, however. Experience in meeting the situation led to improved loading arrangements and to more efficient scheduling and routing. Queue loading at Exchange Place and Summit Avenue stations, the two heaviest loading points in Jersey City, eliminated the congestion prevalent at similar points in Newark and Camden. Express and short-line service as established on the Hudson County Boulevard lines allowed more trips to be made by the individual buses. On some routes in Newark short-line service and non-stop return trips to the center of the city accomplished similar results.

There will be some, of course, who will say that the bus failed in its job during the rush hours. Perhaps it did. On this there is likely to be wide divergence of opinion. It is interesting to wonder what would have happened with an operating organization trained in the intricacies of transportation, in the application of equipment to rush-hour schedules, and in the supervision of buses on the street.

When all is said and done, the single-deck, one-man individually owned bus has done a good job in New Jersey. Overnight the number of passengers seeking bus accommodations was practically tripled, while the number of buses imported amounted to less than half of the local equipment. Both the city bus supervisors and the various line-pooling organizations alike deserve credit, and are to be congratulated on the results so far obtained.

## *It Pays to Advertise!*

**T**HE experienced manufacturer knows that if he brings out some new and novel commodity, widespread advertising will be necessary to introduce it promptly and properly to the buying public. Motor carriers, particularly those operating in intercity service, must awaken to the same truth. They are offering something not heretofore sold extensively and they can stimulate their business in a most helpful way by proper advertising; by doing their part toward acquainting the public with the advantages of the form of transportation they conduct.

With steam and electric railways, merchandising transportation is an old story. They realize full well the advantage of advertising and even when business is on the decline recognize it as a necessity in selling their stock in trade—transportation. Travel by motor bus is rapidly gaining in popularity and offers many opportunities for attractive advertising. Wide-awake companies have made a good start in this direction, but there is yet much to be done, particularly in educational advertising of a general character, i.e., that calculated to develop a general appreciation of the advantages of travel by motor. This is something that can be done to excellent advantage by bus organizations.

The article elsewhere in this issue describing joint stage advertising methods at Portland, Ore., has in it two valuable suggestions. It shows the advantage of advertising by citing that the volume of business through the terminal involved increased more than 50 per cent within the year (and of this increase a considerable part must be credited to the advertising) and it illustrates one of the very effective ways in which trade associations can be used for the common good. Well-directed advertising will pay the motor carriers good dividends, something which the industry cannot afford to overlook. This will come of itself, to a great extent, so far as the larger companies are concerned. The need of the industry just now, and particularly of the "little fellow," is the encouragement of joint or group advertising so that the advantages of "Travel by Motor Stage" may the sooner become well known to the traveling public.

—[ EDITORIAL ]—

## *Know Connecting Schedules*

**M**ANY undertakings fail because the owners do not sell their service to their patrons. It is not enough merely to run buses on a schedule over a fixed route. A service of this kind may attract enough patrons to meet the expenses of operation and provide a small profit, but the bus owner must advertise his route, his leaving time and the connections made with other bus routes and transportation lines if he is to achieve any large measure of success. Moreover, the men on the drivers' seat must understand that they are the personal representatives of the company or line, and that the public judges the enterprise very largely by its impression of them.



The driver is the salesman of the service and should be prepared to answer simple questions regarding connecting schedules, fares to near-by points, etc., or know where such information may be quickly obtained. He need not be an oracle, or encyclopedia, but the next best thing to being able to answer a question at once is to know where the answer can be found. Good service is not alone the beginning and the end. Little courtesies count in all walks of life, but particularly in intimate relationships. And in the transportation world there is, perhaps, no more intimate relationship than that of the bus driver to his patrons.

[ EDITORIAL ]

### *Lessons from the Sightseeing Business*

**T**HE bus operator who thinks he has gone the limit in "selling" transportation should take a look at the work done by sightseeing operators. Operators of "rubber-neck" wagons in our large cities and of stages that hold the wonders of nature up to the admiration of tourists—they are the ones who hustle for business and who get it.

Take the sightseeing operators in New York City. They start out by having stands at the big hotels and good locations in the most prominent squares. The drivers are on the job, down on the sidewalk where they can talk to the possible patrons and can give them a hand in climbing aboard; not slumped down in the vehicle waiting for something to happen.

Then the vehicles are "dolled up" to attract trade, and are emphatically marked with the attractions to be seen on the trip. Some of the operators even go so far, it is said, as to hire "dummies" to sit on board until the paying passengers arrive. Then these "dummies" move along to the other buses and do the same work over again. It is the spirit of this, of course, and not the methods, that the bus man should copy. He should tell the world about his bus business and make the world welcome when it arrives.

Some sightseeing operators often have no stands at all on the streets. All their business is done by contract with clubs, societies and the like. It is this type of work that would probably be of the most interest to the bus operator, since of necessity he must handle it at times when buses are not required for regular schedule service.

However, many operators have enough equipment so that they can handle this extra work even on their busiest days. With the opening of schools and colleges, athletic teams and groups of students like to travel cross-country to attend athletic events. Conventions are always with us, and it is a case of looking ahead and arranging with the proper officials, to take over responsibilities they are glad to unload.

In spite of this it is worth while. Byproducts in the way of advertising card income, and money taken in for carrying parcels, often make the difference between profit and loss. Charter or tour business is one of the most important of these byproducts.

Just as long ago the packing business found it must sell the squeal of the pig, so every possible source of profitable income must be used by the bus operator.

### *A Basis of Discussion*

**T**HE bus operator who takes the railway as a basis for settling the New Jersey transportation controversy will find that much of the ground is fundamentally sound, although some of the details are open to question. It is therefore a fitting point of discussion.

Considering only the bus aspect of the problem, its foundation is the recognition that transportation, like electricity and gas, to be sold in the open market and with the greatest satisfaction to the consumer, must not be supplied by separate organizations under competitive conditions. BUS TRANSPORTATION believes that only through proper coordination of bus and rail can the best interests of the public and of the types of transportation be met.

Representatives of the public object strenuously to the proposed bus-fare increase. Newark, Paterson and other cities, in which buses are being operated at a 5-cent fare, insist on the continuation of this rate as a part of any future transportation arrangement. The trolley fare has been 8 cents, and the trolley proposes to operate both the bus and trolley for a 7-cent fare, with a 1-cent charge for transfer. Bus transportation in New Jersey cities has been developed to its present proportions largely with short hauls and low fares to the main business district. This indicates certainly that the public favors these business center fares more than the higher long haul crosstown fares and transfer charges. It is this system of basing fares with the rate at the lowest possible point consistent with the length of haul and load factor that appeals to the rider.

It is not too much to expect such a plan could be worked out for both the trolley and the bus to give a reasonable return on the investment and at the same time be satisfactory to the representatives of larger municipalities.

The proposal of the railway also contemplates the purchase of buses on rail-line streets, at what is called their fair physical value. This naturally is objected to by the bus owners, since it provides no compensation for their efforts in building up the bus business. However, the proposed values can be construed as a starting point, from which something satisfactory to both parties can be decided upon.

The bus owners because of their very position can insist on what they consider a fair price if they are to sell their buses and give up their operating rights; also that this price shall compensate them for their business on the basis of a going concern. The railway, which is seeking to buy, is like all prospective buyers. It is in the position of a bargainer who wants something that the other man has or owns. Moreover the other man, that is, the bus owner, is indifferent whether he sells. If the sentiment expressed by spokesmen of the bus operators is a criterion, they will not sell at any price.

At this writing a committee representing various Jersey municipalities is conferring with representatives of both the bus operators and the Public Service Railway. It is hoped that its work will lead to an early settlement of a most difficult and involved problem.

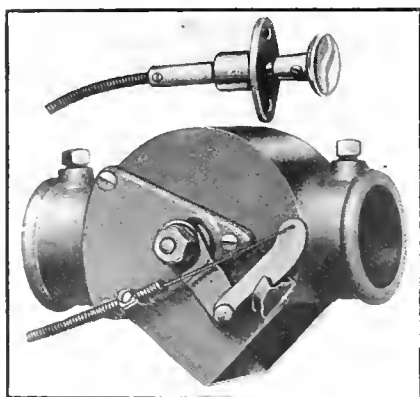


# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Improved Tuning-Up Valve

THE N. A. Petry Company, Inc., Philadelphia, has brought out what is said to be a great advance in tuning-up valve construction and control. The main purpose of this



*New design of Petry tuning-up valve*

is to do away with the flutter of the valve by locking the tongue in the closed position.

There is also a positive lock for the dash control mechanism, holding it in any position, and yet permitting it to work freely when unlocked.

All this is secured by the use of an extra lever placed between the dash control wire and the lever at-

tached to the valve tongue. This extra lever has a notch cut at the bottom which fits on a lug cast on the valve, locking the tongue in the closed position. As the valve is opened the lever slides along the lug mentioned and is thus held securely at any open position.

## Belt Device Replaces Rear Wheels

WHAT is said to be an immense advance in motor transportation is the endless band driving attachment developed for André Citroën, one of the largest French makers of automobiles, and sometimes called the "Ford of France." The Kegresse-Citroën device, called thus after the inventor and the head of the company manufacturing it, is shown in the accompanying illustration, mounted on a camion, as the small motor truck is called in France. The two rear wheels are replaced by a flexible rubber band, small rollers are used for bearing the load, and there are two pulleys; one at the rear drives the band and the one at the front is loose.

This device can be installed, it is said, on touring cars, buses, or trucks, with minor changes. An increased capacity of radiator is

recommended. The system also includes a gear ratio reducer, which is simply an extra two-speed gear-box at the rear axle, and a differential lock, both controlled by levers at the driver's position. Steering is similar to that of an ordinary car, except that when the vehicle makes a turn the steering wheel automatically operates a device having a braking action on the inner band. With this it is possible to turn in a smaller radius than would be required for a four-wheel vehicle. In snow operation detachable "skis" or small runners are provided on the front wheels.

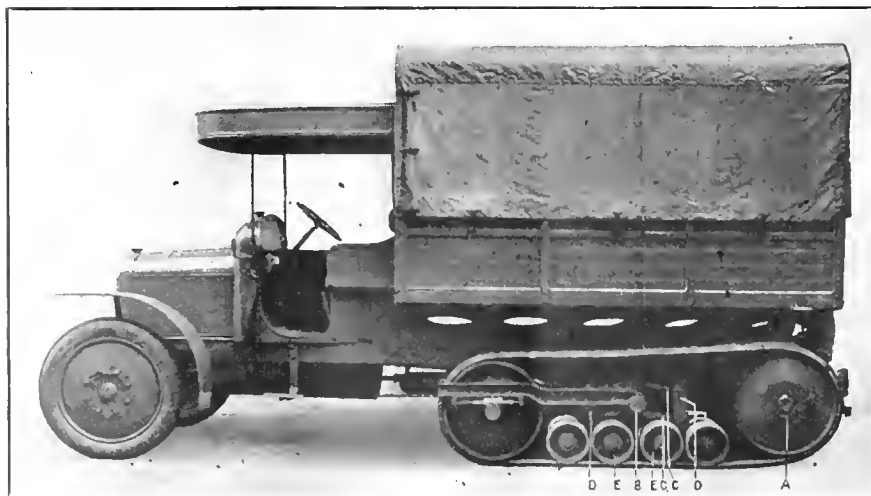
In order to obtain a positive drive of the endless band, the driving pulleys *A* on each side are in two sections, between which the endless band projects. A special hub is fitted on these two half-pulleys so that they close up in proportion to the engine load, and thus securely wedge the inner part of the band, which is V-shaped. The band can be tightened or slackened by a hand crank. On the outside the band is made with grooves so that it grips soft ground in the same manner as the lugs used on farm tractors. The material is rubber and canvas vulcanized to form a solid belt or band.

The construction of the driving mechanism is illustrated by reference to the photograph, here reproduced, and the following:

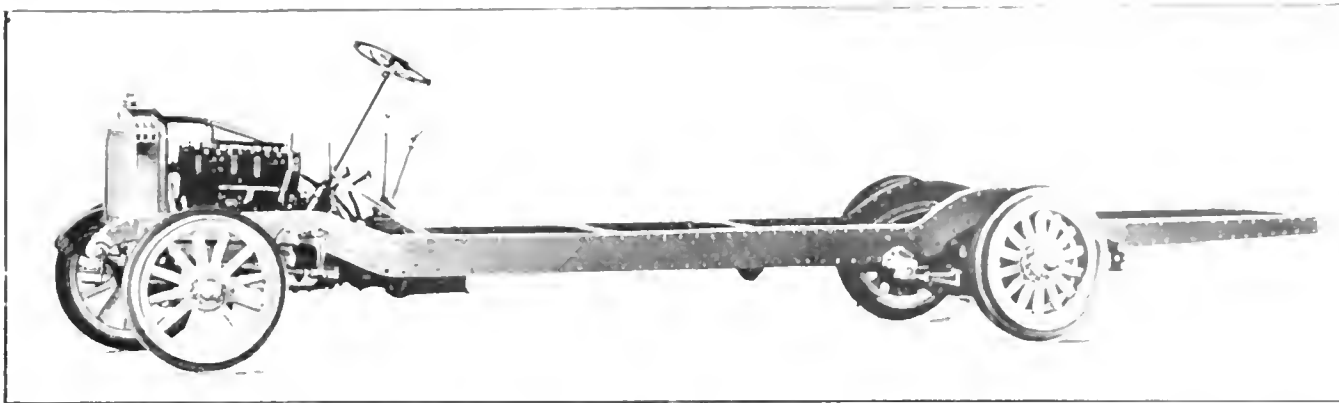
An axle, *B*, rigidly fixed to the chassis corresponds to the rear axle of the ordinary vehicle, and carries the weight of the chassis and body. On both ends of this axle are spring compensators placed one above the other and hinged in the middle. These compensators are joined by links *D*, which support the load-bearing rollers *E* at each end. The weight of the corresponding part of the vehicle is therefore transmitted to the ground, through these moving parts (rollers) and the flexible band.

The front pulley (shown at the left) bears on the ground because of its own weight. The weight of the vehicle is carried by the axle *B*, however, and the springs on which the small rollers are supported. As a result, when the vehicle moves forward and meets with an obstacle, the front pulleys are pushed up into the air, and the lower part of the band changed into a sort of inclined plane over which the rollers run.

The maker reports that the device has been attached to several experimental motor buses, which were sent through roadless regions covered



*French camion fitted with endless band rear drive for traveling through snow or over soft roads*



with high snow banks such as would have prevented operation under ordinary circumstances. These experimental buses passed through the drifts and snow banks as if they were a firm asphalt roadbed.

### Acme Brings Out Under-slung Bus Chassis

THE accompanying illustrations show side and top views of the new Model K bus chassis, a product of the Acme Motor Truck Company, Cadillac, Mich. This is a 200-in. wheelbase job, which can be supplied in two over-all chassis lengths (280 or 312 in.), to take twenty-five or thirty passenger bodies, respectively.

One of the features of this chassis is the frame, which is special Acme construction. Side rails, of 9 in. steel plate  $\frac{3}{8}$  in. thick, tapering at both front and rear ends, are riveted to angle irons (2 x 2 x  $\frac{3}{8}$  in.) at top and bottom to form what appears to be the conventional channel shape. Back of the dash, the frame drops about 6 in., and is swept up over the rear axle, giving 36-in. tires a distance of 27 in. from top of frame to ground under load.

The power system consists of a Continental Red Seal engine, 1  $\frac{1}{2}$  x  $\frac{5}{8}$  bore and stroke, giving 45 hp. on

*Built-up frame construction used on Acme bus chassis, consisting of steel plate with angles riveted at top and bottom.*

brake test. This is set on a slight angle, so as to secure a straight line back to the rear axle. Ignition is by Eisemann magneto, and a Duplex governor keeps the speed down to 25 m.p.h. at 1,600 r.p.m. of the engine. The drive is through a Cotta constant-mesh transmission mounted in a unit with the engine, and Borg & Beck single dry plate clutch, 12 in. diameter and  $2\frac{1}{4}$  in. face. The drive shaft is in three pieces with four universal joints, carried in self-aligning ball bearings, which in turn are supported by two cross-frame members. The rear axle is Timken-Detroit, inverted worm type, with a standard reduction of  $6\frac{1}{2}$  to 1. This has a 74-in. gage. On the front the Timken axle also is used, but of only 58  $\frac{1}{2}$  in. gage. A Ross steering gear, with 20-in. steering wheel, is supplied, this being of the irreversible nut and screw type.

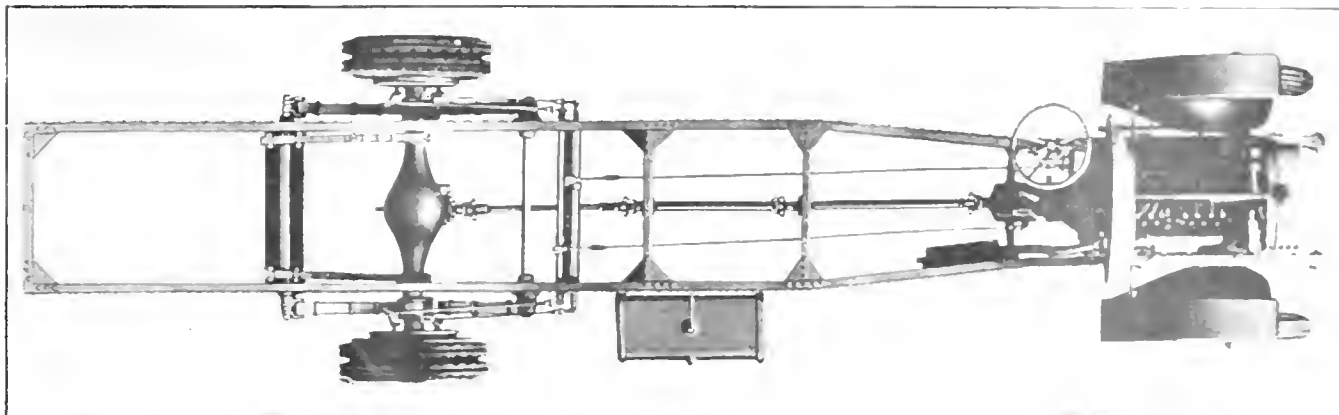
Easy riding and unusual loads are provided for by the auxiliary springs, which are shown in the top

*Plan view of Model K Acme bus chassis. Auxiliary springs appear on each side of rear axle housing.*

view. These are of the half-leaf lever type, arranged to bear on each end of the rear axle housing. The main springs are of the Detroit make, 12 in. long at the front and 61 in. at the rear. Standard tire equipment will be 36 x 6 pneumatic front, and 36 x 5 dual cushion rear. The fuel tank, which has 29 gal. capacity, is mounted on the side of the frame with inlet control accessible from the outside. The equipment includes lamps, horn, jacks, tools, tool box, Alemite greasing system, and Veeder hubometer. Electric starter and generator can be supplied as optional equipment.

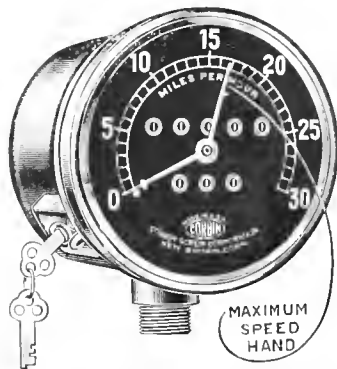
### Heavy Duty Speedometer Records Maximum Speed

THE Model B speedometer, of which two views are shown here, is built by The Corbin Screw Corporation, New Britain, Conn., especially for heavy-duty service. The head shown is marked for 30 m.p.h., but it can be calibrated to 60 miles. Another feature is the luminous dial and hand so that the instrument can be read at night without requiring a dash lamp. This instrument depends on the centrifugal principle for operation, the centrifugal unit or governor being fitted with counter-balanced weights.



Odometer and speed indicating mechanism are housed within a seamless drawn brass cup. The dial is protected by a plate glass spun into the bezel to make a weather-proof joint.

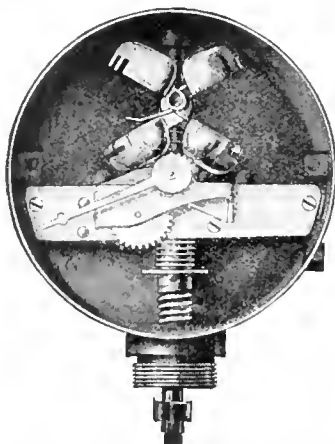
The outside view shows the maximum speed hand, an optional



*Corbin heavy-duty speedometer, fitted with maximum speed hand. This is controlled by key shown at left*

part of the speedometer. This hand is carried along by the main indicating hand of the speedometer, and remains at the highest point until reset by the plunger at the left. To prevent resetting by the driver, this plunger may be provided with a lock, which prevents its being moved unless the key is available.

The total odometer records up to 99,999 miles, working regardless of the direction of rotation of the



*Corbin speedometer head with dial and odometer removed, to show centrifugal speed mechanism*

flexible driving cable, so the instrument may be connected to either right or left-hand wheel. Mileage is recorded also where the vehicle is traveling in either reverse gear or forward.

The Model B speedometer is regularly furnished for front wheel

drive, although in some cases it can be furnished for propeller shaft drive. With the latter it is necessary to have a gear on the universal joint back of the transmission, with which the fiber gear of the speedometer can be meshed.

## Brockway Brings Out Two Single-Deck Designs

WHILE the general construction is the same, the models "J" and "M" bus chassis, just developed by the Brockway Motor Truck Company, Cortland, N. Y., differ somewhat in capacity, wheelbase and size of engine. The model "J," with 185-in. wheelbase, takes a twenty-five-passenger body, while model "M" has 197-in. wheelbase and is fitted for a twenty-nine-passenger body.

Buda bus engines are used for each design, model "J" being fitted with a 4½x5½-in. power plant, while the larger vehicle has an engine with 4½-in. bore and 6-in. stroke. The four-speed transmission and multiple-disk clutch are Brown-Lipe make.

From ground to floor the height is only 28½ in., this being secured by a frame up-swept over the internal gear rear axle. This axle is of Clark construction, with 71-in. wheel gage. The front axle is a Shuler dropped-center type with 66½-in. gage.

Two sets of brakes are provided. On the propeller-shaft is a contracting service brake, working on two 11-in. drums of 5-in. face. The emergency brake acts on rear wheel drums. Merrill springs of the compensating type are underslung, while the steering gear is Gemmer worm and wheel construction.

Fuel is taken from a tank mounted on the right-hand side of the frame through a Stewart Warner vacuum system to the Zenith carburetor.

Electrical details include Leece-Neville lighting equipment, Bosch high-tension magneto and Exide battery of 214-amp.-hr. capacity. Chassis lubrication is by Alemite high-pressure system.

Budd wheels of steel disk type are supplied with pneumatic tires 36x6 on front and 36x6 dual on the rear. Or, steel disk wheels and cushion tires of the same size may be furnished.

The normal speed of the model "J" bus is 35 m.p.h. on high gear and 6½ m.p.h. on low. Chassis weight is about 6,400 lb., or 9,500 lb. with twenty-five-passenger body.

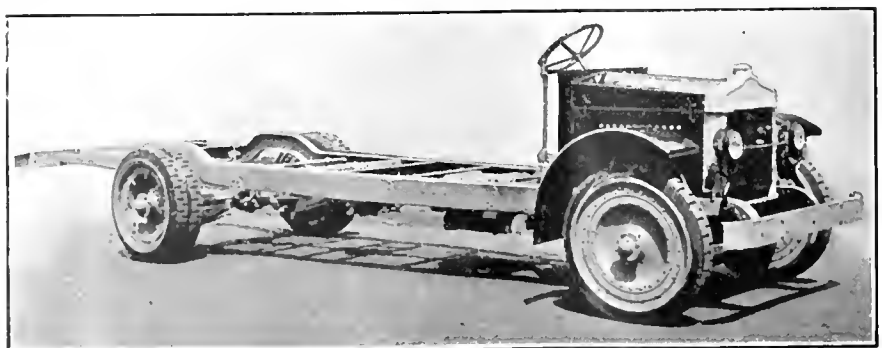
## Bus Tire for 20-Inch Rim

THE Dayton Rubber Manufacturing Company, Dayton, Ohio, has brought out the 32x6 tire, as shown in the illustration. This is of the doughnut type, for mounting on a 20-in. rim. The Dayton Thorobred Cord, as it is called, is of ten-ply



*Dayton Thorobred Cord, 32 x 6, for bus work*

construction, reinforced by two breaker strips entirely across the tread in addition to the two across the shoulder. The purpose of the additional reinforcing is to prevent tread separation during overloads.



*Brockway bus chassis, 25-passenger capacity, designed for N. Y. State Railways*

## Light-Weight Trunk-Type Piston

THE use of material containing a high percentage of magnesium is the main characteristic of Dowmetal pistons, made by the Dow Chemical Company, Midland, Mich. This alloy is prepared mainly from natural brine pumped from 1,200 to 1,400 ft. underground in the region



*Dowmetal piston cut open to show head construction*

about Midland. The piston shown here is of the trunk type, with three grooves above the pin and one on the skirt for oil control. Dowmetal pistons, it is said, are about one-third the weight of the average cast iron piston and about two-thirds that of the average aluminum piston.

A slightly greater clearance is required than with cast iron, although the Dowmetal piston expands when running, and does this very quickly, so there is no slap when the engine is cold.

One of the main advantages claimed for the material as used in pistons is that it will not score cast-iron cylinders. Neither the magne-

sium itself nor the other substances used in the alloy are abrasive, so the expense for cylinder repairs and upkeep is kept down to the minimum.

Normally the running temperature with Dowmetal pistons is about 300 to 400 deg. F., this low temperature being explained as due to the high heat conductivity of the material, which makes easy the passage of heat from the combustion space to the cylinder walls.

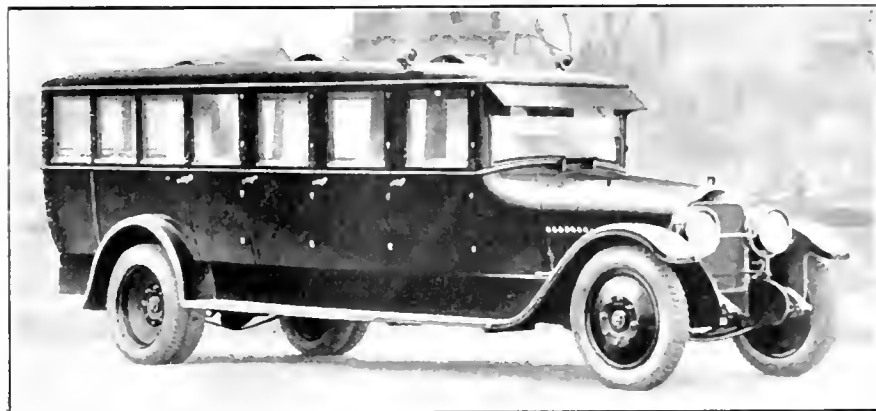
Dowmetal pistons are carried in stock in all standard sizes, and in oversizes from 0.003 in., 0.005 in., and each five-thousandths up to 0.045 inches.

## Sedan Body Has Concealed Radio

THE Lang Body Company, Cleveland, Ohio, has brought out the twenty-two-passenger sedan type body shown in the illustration. It has aluminum panels, is trimmed in genuine leather, and equipped with heater, roof ventilators and dome lights. The one shown has a concealed aerial, to receive radio.

Outlets are provided inside for six 32-cp. lamps of the 12-volt type. Heating is by the pipe system, with 2-in. pipe laid under the seats. The roof is provided with four Nichols-Lintern ventilators.

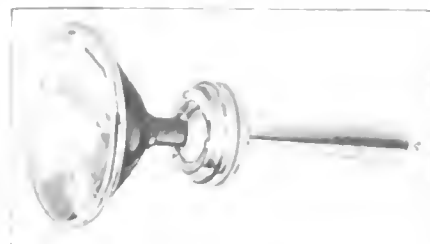
From dash to rear end the body is 18 ft. 6 in. long. Headroom is 56 in., and width of the rear end at floor level, 66 in., this tapering to 56 in. at the front of the vehicle. Entrance to the three seats at the rear is by a door just in front of the rear wheel. The first two of these rear seats are broken by a 24-in. center aisle through which passage is obtained to the full width seat at the extreme rear. There are four doors on the right, and two on the left, each 27 in. wide.



*Lang all-aluminum sedan-type body for twenty-two passengers*

## Spotlight Mounted Through Windshield

THE Fyrac Manufacturing Company, Rockford, Ill., has placed on the market a new spotlight of the through the windshield type. This is made entirely of aluminum and weighs only 1 lb. It operates on a ball swivel joint and throws a spot



*New type of spotlight, to be held in windshield glass*

of light for 1,500 ft. in any direction. The construction is said to be such that the light will hold any position in which it is placed.

Bulbs of any size can be used, according to the battery installation.

For applying the light a special glass cutting tool is supplied so that the hole can be cut without removing the windshield glass. The whole job can be done, it is said, and the light installed completely in ten minutes or less.

## Heavy Duty Cord Has Tractor Tread

THE Diamond Rubber Company, Akron, Ohio, is offering the heavy-service tire shown in the illustration. This has a flat high tread, with what is termed a tractor-like grip. A heavy sidewall reinforcement prevents rut wear and protects the tire against curb chafing. Sizes range from 32x4 to 40x8 in., with gray and red tubes to match.

At present the company is not making these tires for the 20-in. rim, but will consider this when the demand warrants.



## Revised to September 1, 1923

Trade Name and Model	Capacity, Seats		Main Dimensions				Engine Details				Electrical Equipment				Transmission		Axles		Wheels		Tires										
	Unloaded Weights, Lb.	Bus	Wheelbase	Cage, Front	Cage, Rear	Floor Height	Steering Cir.	Normal Speed, M.P.H.	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Battery	Battery, Amp. Hrs.	Starter	Generator	Clutch		Gearset	Front	Rear	Final Drive	Steering Gear	Springs	Brakes	Maker	Type	Type
<b>Light Duty</b>																															
Ame 20	14	3,050	4,250	129	56	33	54	22	7	3x5	V Ryd	T	Own EC	Eise-M	KW-M	Wld	6V90	Wes	Bsh	BgBk DP	Cotta-3	Tim SF	W	Ross	Dirt	R	Binel	Wd	P	35x5	35x5
Avery	18	1,830	4,000	129	56	32	47	25	6	3x4	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V80	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Chevrolet	10	1,830	2,830	120	56	32	47	25	6	3x4	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Commercial T	10	2,900	4,200	127	56	32	47	25	1	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Federal R2	12	2,950	3,850	124	56	32	47	25	1	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Ford T	12	1,430	3,300	132	56	30	46	25	6	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
G.M.C. K-16	12	3,300	5,300	132	56	30	46	25	6	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Graham Bros. C	13	2,625	4,225	140	56	32	47	25	6	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Indiana	15	3,200	4,225	140	56	32	47	25	6	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V90	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
International S	15	2,760	3,510	124	56	32	47	25	7	3x3	V Znth	T	Own FC	Eise-M	Rem-B	Wld	6V100	Rem	Wes	Own DP	Own-3	Tim SF	IT	Ross	Mthr	R	Binel	Wd	P	34x5	34x5
Larrabee-Deyo	15	3,350	4,700	155	56	32	47	25	10	3x4	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Nelson	14	2,050	4,300	131	56	32	47	25	40	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Norland	16	4,000	6,000	180	56	32	47	25	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Nash 2018	14	3,400	6,000	130	56	32	47	25	8	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V100	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Oldsmobile	16	3,400	4,000	122	56	32	47	25	8	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Reo	16	2,635	4,000	126	56	32	47	25	8	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Rockwell	16	2,635	4,000	126	56	32	47	25	8	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Rumely	18	3,820	6,280	133	56	32	47	25	6	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Rumely	18	4,100	6,280	133	56	32	47	25	6	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Squad W-15	18	3,300	4,600	141	56	32	47	25	6	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Standard Service 25	14	3,300	4,600	141	56	32	47	25	30	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V100	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Standard 55	10	3,000	4,000	134	56	32	47	25	33	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Stoughton	16	3,300	5,520	141	56	32	47	25	34	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Thomson	15	3,100	4,400	134	56	32	47	25	8	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Transport 25A	16	3,700	5,500	140	56	32	47	25	30	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
United States U	15	3,400	4,500	132	56	32	47	25	35	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V120	Bsh	Bsh	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
<b>Medium Duty</b>																															
Ame 40	20	5,800	8,200	204	58	34	64	21	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V150	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Ame 40	22	3,980	6,380	141	58	34	64	21	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V150	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Autocar 201T	18	5,600	8,750	144	58	34	64	21	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V150	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Autocar -27K	20	5,600	8,750	144	58	34	64	21	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V150	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Beck	18	3,000	4,100	132	56	32	47	25	30	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V80	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	35x5	35x5
Clydesdale 100	20	4,000	5,500	148	56	32	47	25	35	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Corbett	20	4,000	5,500	148	56	32	47	25	35	3x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	34x5	34x5
Day-Elger	20	5,200	7,700	168	56	32	47	25	7	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Defiance G13	19	3,200	4,400	136	56	32	47	25	25	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Dependable	23	4,100	6,200	150	57	32	47	25	6	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Diamond T-U	23	4,000	6,200	170	57	32	47	25	6	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Duplex AB	23	4,600	7,565	160	58	32	47	25	5	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Fageol	21	5,700	7,300	182	70	32	47	25	35	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
G.M.C. K-20	20	4,030	6,230	178	52	34	62	21	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Hahn	23	4,700	7,700	173	56	32	47	25	30	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Hurlbut	18	4,450	5,600	147	58	32	47	25	15	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Kalamazoo-G1	18	4,450	5,600	147	58	32	47	25	15	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Keystone 40	17	4,850	7,800	202	64	36	47	25	60	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Kussel Coach	17	4,850	7,800	202	64	36	47	25	60	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Master JB D	22	5,600	8,300	170	56	32	47	25	60	4x5	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V153	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Nash 3018	21	3,500	5,600	168	56	32	47	25	40	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	36x6	36x6
Nelson Junbo	21	3,500	5,600	168	56	32	47	25	40	3x3	V Znth	CP	Edrs. H	Bosh-B	ATL-B	Exd	6V90	Rem	Rem	BrLp DP	BrLp-3	Sal	3x3	Gmr	Shldn	R	Indes	StL D	P	3	



[illegible]

**KEY TO ABBREVIATIONS**

**IT**—Pump and thermosyphon.  
**T**—Thermosyphon.  
**RADIATOR**—**MAKE**.  
Chgo.—Chicago.  
Ct.—Connecticut.  
Cal.—California.  
C. & O. G. & O. Mfg. Co.  
Harrl.—Harrison.  
Medl.—McCord.  
Modn.—Moline.  
Natl.—National Can.  
Pax.—Paxton.  
Rel.—Reliance.  
RmTru.—Rumce-Turney.  
Sparks.—Sparks-Withington.  
Stdhd.—Standard.  
Stke.—Sterling.  
**RADIATOR**—**TYPE**.  
Coaldr.—Coaldr.  
Frt.—Fruit Type.  
Hr.—Horse type.  
Plm.—Plain Type.  
So. Sprnc.—Spiral Spring.  
Tubulr.—Tubular.

**BATTERY**—**MAKE**.  
Ecll.—Eclair.  
Gndl.—General.  
Pnt.—Pentacell.  
Psl.—United States.  
Vn.—Vesta.  
Wt.—Westinghouse.

**ELECTRICAL EQUIPMENT**.  
Wt.—Westing.  
Mlz.—Muller.  
Vn.—Vesta.

**FUEL FEED**—**TYPE**.  
F.—Pressure-gravity.  
G.—Gravity.  
P.—Pressure.  
V.—Vacuum.

**CARRIAGE LOR**—**MAKE**.  
Eggen.—Eggen.  
Fethr.—Fletcher.  
Hmsn.—Johnson.  
Mrvl.—Marvel.  
Ryfd.—Ryfield.  
Stmbk.—Stromberg.  
Schbr.—Schubler.  
Stwrt.—Stewart.  
Znth.—Zenith.

**COOLING SYSTEM**.  
Cp.—Centrifugal Pump.  
Gp.—Gear Pump.  
Tump.—Tump.

**PUMP AND THERMOSEYPHON**.  
T.—Thermosyphon.  
R.—Radiator.  
C.—Cylinder.  
H.—Horse.  
M.—Morse.  
N.—Norton.  
P.—Pump.  
S.—Spiral.  
T.—Tubular.  
V.—Vacuum.  
W.—Water.  
X.—X-ray.  
Y.—Yield.  
Z.—Zinc.

**VALVE**—**MAKE**.  
A.—A. & O. Mfg. Co.  
B.—Bosch.  
C.—Chicago.  
D.—Dodge.  
E.—Eggen.  
F.—Fletcher.  
G.—General.  
H.—Harrison.  
I.—Ingersoll.  
J.—Johnson.  
K.—Kearney.  
L.—Lynch.  
M.—Morse.  
N.—Norton.  
O.—Ogden.  
P.—Pump.  
Q.—Quincy.  
R.—Radiator.  
S.—Spiral.  
T.—Tubular.  
U.—Union.  
V.—Vacuum.  
W.—Water.  
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**VALVE**—**TYPE**.  
A.—A. & O. Mfg. Co.  
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O.—Ogden.  
P.—Pump.  
Q.—Quincy.  
R.—Radiator.  
S.—Spiral.  
T.—Tubular.  
U.—Union.  
V.—Vacuum.  
W.—Water.  
X.—X-ray.  
Y.—Yield.  
Z.—Zinc.

**VALVE**—**LOCATION**.  
A.—Above.  
B.—Below.  
C.—Center.  
D.—Down.  
E.—End.  
F.—Front.  
G.—Grip.  
H.—Head.  
I.—In.  
J.—Joint.  
K.—Knee.  
L.—Line.  
M.—Main.  
N.—Nose.  
O.—Out.  
P.—Pump.  
Q.—Quincy.  
R.—Radiator.  
S.—Spiral.  
T.—Tubular.  
U.—Union.  
V.—Vacuum.  
W.—Water.  
X.—X-ray.  
Y.—Yield.  
Z.—Zinc.

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R.—Radiator.  
S.—Spiral.  
T.—Tubular.  
U.—Union.  
V.—Vacuum.  
W.—Water.  
X.—X-ray.  
Y.—Yield.  
Z.—Zinc.

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A.—Above.  
B.—Below.  
C.—Center.  
D.—Down.  
E.—End.  
F.—Front.  
G.—Grip.  
H.—Head.  
I.—In.  
J.—Joint.  
K.—Knee.  
L.—Line.  
M.—Main.  
N.—Nose.  
O.—Out.  
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# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transporta-  
tion industry.

## Railway Methods Advocated for Bus Maintenance

THE program of the railway conference held Aug. 16 and 17 by the Wisconsin Utilities Association at Oshkosh included two papers of interest to bus operators. Bus maintenance and repair problems in general were treated by Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad. Mr. Cordell predicted that the concerted and constructive criticism available as the result of the operation of buses by electric railways would lead to the building of improved equipment that would compare favorably with electric cars. He also described the inspection methods used in handling the North Shore buses. An abstract of Mr. Cordell's paper appears below.

### DEVELOPMENT OF TRANSPORTATION INDUSTRY DEPENDS ON TIRES

Howard Smith of the General Tire & Rubber Company, Akron, Ohio, told the meeting that the development of motor bus transportation is largely dependent upon the improvement of tires, just as was the development of the private automobile. The tire industry has endeavored to reduce the stiffness in tires and yet prevent internal friction, with the result that today tires carry 50 per cent less air pressure than five years ago. Internal friction causes power loss and also shortens life, so that the tire with the least air pressure is the one most to be desired for efficient operation.

Mr. Smith pointed out that proper inflation, determination of size relative to load carrying and mating up of tires in dual service are the determining features of long life. He favored pneumatic tires as compared with solid, because the former lessen greatly the effect on the chassis of road construction; they are easier on the road surface, less gasoline per mile is used and comfort and consequently satisfaction of passengers is secured.

### DISCUSSION

In discussing the two papers H. L. Dobbink, in charge of bus work for the Milwaukee Electric Railway & Light Company, said that he had overcome a great deal of the grooving of brake drums on the propeller shaft by staggering the lining rivets. The difficulty caused by end thrust in propeller shafts fitted with fabric universal joints has been overcome by a spline on the shaft.

W. E. Thorn urged railway men operating the buses to make their own inspections and do their own repair work. Railway men, he maintained, were more thorough in their work than the mechanics in private garages.

## North Shore Operation\*

BY HENRY CORDELL  
Master Mechanic Chicago, North Shore &  
Milwaukee Railroad, Highwood, Ill.

EVERYWHERE throughout the country we find the electric roads heavy buyers of motor buses. Not all of them have done this because of competition; many, because of the desire to serve the public and incidentally because the operation would act as a feeder to their own electric lines. It would also prevent private interests from engaging in competitive operation.

This acquisition has meant, however, a new maintenance problem. An organization educated to maintain electric car equipment can hardly be expected to be automobile experts.

\*Abstract of paper before conference of Electric Railway Section, Wisconsin Utilities Association, held Aug. 16 and 17, 1923, at Oshkosh, Wis.

The use of old crankcase oil was the subject of a round-table discussion entered into by most of those present. In Milwaukee, Mr. Dobbink said, the oil in the engine crankcase was completely changed every 2,000 miles, when the vehicles were thoroughly inspected. Oil was added, however, in the intervening time as the level was lowered. On the Eastern Wisconsin Electric Company lines, operating about 1,500 to 1,600 miles per day, according to Earl Harre, the average mileage is 9.6 per gallon of gasoline and 58 per quart of lubricating oil. Mr. Cordell said that he intended to use the crankcase oil in the journal bearings of railway cars operated by his property. It was also suggested that the old oil could be stored during the summer and then used in winter as fuel to heat the garage, by means of a suitable oil-burning outfit.

Here is where most of us will be pleasantly surprised. In the shop department of any electric road you will find men who can turn their hands to any emergency. Most of the men assigned to bus inspection on the electric roads are men who have kept electric cars in good condition for years. Why should they fail on the buses?

There is a decided advantage in using tried and true men on this work even if you have to educate them. One thing they do know, and that is what is required as to close and careful inspection, lubrication and cleanliness. After all, the difference between an interurban or a street car and a bus is not so great as it might appear at first.

The body, with the exception of the shape, is the same. The wheels are still in evidence, except of different construction; the axles, bearings and brakes are all functioning the same.

The motor, control and means of power transmission differ mostly, and it is here that we must spend most of the time instructing not only our men but ourselves.

### ELECTRICAL IMPROVEMENT

The electrical equipment—generator, battery, magneto, wiring and lighting—will be found very much along the same line as the electrical apparatus and wiring on the cars, and will be readily understood.

There is much to be desired in the method of wiring of a bus. Because of the low voltage it has been done in a more or less shiftless way, and fixtures and sockets are not substantial. No doubt most of you remember the old car wiring. It was exposed to the weather and mechanical injury, resulting in failures and costly burnouts. A change was brought about by the customers getting together with the manufacturers, who were willing to cooperate. We are looking forward to

## Meetings, Conventions and Exhibits

- Sept. 3-8—Motor Dealers' Association, Annual Show, Sacramento, Cal.
- Sept. 19-22—Motor and Accessory Manufacturers Association, Fall Convention, Boston Mass.
- Sept. 20—Society of Automotive Engineers, Metropolitan Section, New York, N. Y.
- Sept. 28-Oct. 5—Annual Automobile Show, Fresno, Calif.
- Oct. 1-5—National Safety Council, Exhibit, Buffalo, N. Y.
- Oct. 8-13—American Electric Railway Association, Annual Convention, Atlantic City, N. J. (includes exhibit of buses and accessories).
- Oct. 13-28—Dallas Automotive Trades Association, Annual Fall Show, Dallas, Tex.
- Oct. 25-26—Society of Automotive Engineers (Production), Cleveland, Ohio.
- Nov. 12-17—Automotive Equipment Association, Annual Business Exhibit and Convention, Coliseum Chicago.
- Nov. 13-15—National Tire Dealers' Association, Annual Meeting, New York City.
- Dec. 19—Philadelphia Motor Truck Association, Philadelphia, Pa.
- Jan. 5-12—National Automobile Show, Eighth Coast Artillery Armory, New York City.

*Driver's defect report made out in triplicate. An "explanation" of the troubles reported is given in detail on the back of the garage foreman's copy.*

On the average, a daily bus mileage

The inspection card used in connection with our inspection work, both for buses, tractors and trailers, is self-explanatory. This card is filled out for every piece of equipment which undergoes inspection and every item

Inspector card, designed to  
bases and other motor vehicle  
Size 4 1/2 in. width and 6 1/2 in. height  
cardboard

The defect reports are filed under

the bus, tractor or trailer number, so we can check the defects developed in service. They also show which piece of equipment requires improved construction.

Oil in the crankcase is changed at every inspection and all parts greased. The manufacturers recommend an oil pressure of from 5 to 20 lb. for engine lubrication. We have found this pressure insufficient and have increased it to 1 lb. for each mile of vehicle speed.

Spark plugs are removed and cleaned, adjusted or replaced. The gap between points must be more than  $\frac{1}{32}$  in. on the White engines and  $\frac{1}{16}$  in. on the Fageol (Hall-Scott) engines.

#### CARBON IS SCRAPPED

If carbon deposits are discovered that interfere with the working of the engine they are removed by scraping. This is necessary after 2,000 to 3,000 miles on the tractors and 10,000 to 12,000 miles on the buses. The use of oxygen is not considered practical. No matter how carefully this is done, burnt carbon will remain along the edges of gaskets and valves. It will then be sucked into the cylinder and get between the piston and cylinder wall, causing excessive wear and scoring.

The cylinders of our buses, after 45,000 miles, present a perfect finish and compression. We feel that changing of oil regularly and scraping of carbon are responsible for this.

The valves are checked to ascertain clearance; that is, the distance between tappet and valve stem, and a clearance of 0.008 in. on intake valves and 0.010 in. on exhaust valves is maintained on the White buses. This is very important; if the clearance is less than 0.006 in. it will ruin the valves, or if more than 0.012 in. it will cause excessive noise. On the Fageol buses both exhaust and intake valves are set at 0.010 in. clearance.

The battery is inspected frequently and distilled water added as needed. If a battery is found low the cause, whether defective generator, stuck brushes, burnt contact in compensating charging relay or defect in wiring, is located and repaired before a fresh battery is installed. The removed battery is then put on charge until fully recovered.

For battery charging we use a series of resistances on 550 volts direct current, which we obtain from our own lines. Steps of 2 to 8 amp. are provided.

On the first buses the batteries were under the floor. Experience soon led to a better location and we put them under the seat alongside the driver in a neat box to match the inside finish of the bus.

Buses used in heavy traffic and over rough country roads are subjected to severe stresses and body bolts should be inspected regularly. A body loose from the chassis not only is noisy but soon wrecks itself.

Brake rod clevises, pins and connections must be carefully inspected and lubricated. We remove propeller-shaft brake drums every so often and turn down the surface, which has become grooved by the action of sand or grit. Unless this is done the brake lining will wear rapidly and the braking power impaired.

Lining on propeller-shaft brakes lasts about 10,000 miles and on emergency 25,000 miles before renewal.

Screens in the gasoline line at vacuum tank and carburetor must be cleaned every 500 miles and the gasoline line inspected for possible leaks.

#### CARE OF FABRIC DISKS

Propeller shafts must be carefully inspected to ascertain the condition of the universal joints. Ample lubrication must be furnished metallic joints.

Fabric disks, when used, must be drawn up tight. If permitted to run loose the holes will tear out, with total failure of the disks. It is advisable to renew disks when fabric begins to crack from fatigue. We have experienced considerable trouble from these failures and feel that the disks must be improved.

#### WHY DISK WHEELS GET LOOSE

Many operators have experienced trouble with loose disk steel wheels. We also experienced this at first, but it was easily overcome. The trouble was lack of inspection and elbow grease. The most important part is to see that dirt and paint are cleaned off the hub and wheel faces before they are assembled.

Unless drawn home tight the wheel will work loose where it fits over the hub and ball-shaped shoulder on the studs. Nuts on the wheel studs are gone over at every inspection and the drivers are instructed to apply a special wrench at least once a day. This method saves costly repairs and if followed no trouble will be encountered.

The rear wheel axle shafts have broken two or three times. It was found that the wheel hub did not fit properly and became loose, throwing the strain on outer end of taper fit. To guard against this a stout wrench was designed, with which the nut on the shaft is drawn up very tight at every inspection. Since we have done this no shaft has broken.

Springs can be kept in splendid shape, we have found, by the use of old crankcase oil. We use this oil in abundance, painting the springs every inspection day. It is unnecessary to pry the springs apart as the oil penetrates between the leaves while the bus is on the road.

Safe and economical operation of motor buses rests not only with th

### Motor Bus Organizations

**NATIONAL MOTOR TRANSPORT ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; manager and secretary, E. B. Burritt, Flisk Building, 250 West Fifty-seventh Street, New York, N. Y.

**ARIZONA MOTOR TRANSPORTATION ASSOCIATION:** President, D. C. O'Neil, Douglas, Ariz.; secretary, F. A. Jones, 127 North Central Avenue, Phoenix, Ariz.

**MOTOR CARRIERS' ASSOCIATION:** President, W. E. Travis, president California Transit Company, San Francisco, Calif.; secretary, James G. Blaine, 1230 Bush Street, San Francisco, Calif.

**CONNECTICUT MOTOR STAGE ASSOCIATION:** President Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; secretary, Edward J. Gildea, treasurer Congress Taxi Company, Danbury, Conn.

**DELAWARE BUS TRANSPORTATION ASSOCIATION:** President George A. Moses, treasurer West Chester & Wilmington Transportation Company, Wilmington, Del.; secretary, C. S. White, president Delaware Rapid Transit Company, Wilmington, Del.

**MOTOR TRUCK ASSOCIATION OF FLORIDA:** President, W. T. Callahan, Miami; secretary-treasurer, D. E. McMahon, 26 N. W. 1st St., Miami, Fla.

**GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION:** President, E. A. Harrison, Bainbridge, Ga.; secretary, W. M. Riley, Decatur, Ga.

**INDIANA MOTOR BUS OWNERS' ASSOCIATION:** President, H. E. Jahns, general manager Jahns' Bus Lines, La Porte, Ind.; treasurer, W. E. Rentschler, manager Indiana Motor Bus Company, Plymouth, Ind.

**IOWA MOTOR TRANSPORTATION ASSOCIATION:** President, J. Edgington, Des Moines, Iowa; secretary, E. P. Cronk, Des Moines, Iowa.

**MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION:** President, E. Foster Moreton, president Moreton Trucking Company, Third and Howard Streets, Detroit, Mich.; secretary, H. H. Hardy, Fireproof Storage Company, Lansing, Mich.

**MINNESOTA MOTOR BUS ASSOCIATION:** President Rodney S. Dimmick, president Touring Car Bus Company, 29 Seventh Street North, Minneapolis, Minn.; secretary, Earl E. Jackson, Endicott Arcade, St. Paul, Minn.

**NEW JERSEY BUS TRANSPORTATION ASSOCIATION:** President, John Morning, 408 Warren Street, Newark, N. J.; secretary, Harry Buesser, 79 Madison Street, Guttenberg, N. J.

**NEW JERSEY AUTO BUS ASSOCIATION:** President, George F. Seymour, Jr., 20 Clinton Street, Newark, N. J.; secretary, George L. Cowan, 20 Clinton Street, Newark, N. J.

**AUTO BUS ASSOCIATION OF NEW YORK STATE:** President, Stanley Chatterton, treasurer White Rapid Transit Company, Lima, N. Y.; secretary and treasurer, James J. Dadd, president Rochester Bus Lines Advertising Corporation, 120 Vermont Avenue, Rochester, N. Y.

**OHIO MOTOR BUS ASSOCIATION:** President, R. E. McCollum, Ohio Motor Bus Company, Columbus, Ohio; secretary, C. J. Randall, 419 Majestic Building, Columbus, Ohio.

**AUTOMOTIVE CARRIERS' ASSOCIATION OF OREGON:** President, Max H. Clark, Camas Stage Company, Portland, Ore.; secretary, J. L. S. Shedd, manager Oregon Auto Stage Terminal Company, Portland, Ore.

**PENNSYLVANIA MOTOR BUS OWNERS' ASSOCIATION:** President, Frank Martz, treasurer White Transit Company, Plymouth, Pa.; treasurer, W. J. Emerick, president Emerick Bus Lines, Bellefonte, Pa.

**WASHINGTON AUTO TRANSPORTATION ASSOCIATION:** President, A. C. Ellington, Des Moines Auto Company, Seattle, Wash.; secretary-manager, Erven H. Palmer, Terminal Building, Seattle, Wash.

**WISCONSIN MOTOR TRANSPORTATION ASSOCIATION:** President, A. C. Homan, Menasha, Wis.; secretary, E. H. Kambe, Caswell Block, Milwaukee, Wis.

mechanical department but also with the operating department. Careless driving, by this I mean indifference as to the mechanical parts of the car, quick starts, quick stops and disregard for road conditions cause heavy maintenance expense. Lack of knowledge of the internal combustion engines plays an important part. Few drivers really understand how the efficiency and working of an engine is affected by spark timing, which is largely under their control.

As a closing word I would like to impress upon all of you, private car owners and operators alike, to keep your engines clean. Do not permit oil and grease to accumulate under the hood or elsewhere, except where it is needed. Many a good vehicle has burned up on this account. And again, quit racing; stop at railroad crossings, and obey the traffic rules of the land.

### Seeking New Markets for Automotive Products

**W**IDENING the market for automotive products" will be the dominating theme of the fall convention of the Motor and Accessory Manufacturers' Association, to be held at Boston, Sept. 19-22. Among the factors to be considered in connection with this subject are the need for more and better roads, the problem of reducing maintenance costs and increasing service efficiency, the acute need for more space to drive and park automobiles in crowded cities, the need of removing unfair automobile taxation and the world view of motor transportation.

Several hundred executives representing manufacturers of parts, accessories and units for the automotive industry are expected to attend this meeting. Dr. John H. Harris, Deputy Police Commissioner of New York City, will deliver an address on "Providing Ample Space to Drive and Park Cars in Our Cities."

Others who will speak include Harry Meixell, secretary of the Motor Vehicle Conference Committee, and W. H. Chandler, traffic manager Boston Chamber of Commerce. J. F. Kelly, Jr., export manager Electric Storage Battery Company, recently returned from Europe, will speak on "The European Situation and Overseas Market." Each paper will be followed by a general discussion.

For the first time in the history of the association emphasis will be given to problems relating to jobber distribution. It is felt that in considering ways and means of widening the markets for automotive industry consideration of jobber distribution is of great importance.

Among those who will address the convention on the question of distribution through jobbers are: E. P. Chalfant, chairman board of directors Gill Manufacturing Company; B. M. Asch, president Asch & Company, Inc., and J. M. McComb, vice-president Crucible Steel Company of America.

## Motor Transport Growing in Europe

N.A.C.C. Delegate to Roads Meeting Reports on Highway Transport Plans—Rapid Development Anticipated

**R**ESPONSIBLE government officials the world over now recognize the utilitarian value of the motor vehicle as an element in transportation, according to Pyke Johnson, representative of the National Automobile Chamber of Commerce, who has just returned from a study of transport conditions abroad. Mr. Johnson attended the fourth session of the International Road Congress at Seville, where some 600 of the leading highway officials of the globe gathered to exchange information and views.

"The dominant note at Seville," said Mr. Johnson, "was a general recognition that motor transport is on a permanent basis abroad as well as in the United States, and with this in mind, discussion centered on ways and means of giving it the broadest possible economic application."

#### TO ORGANIZE MOTOR TRANSPORT

"Among the resolutions passed were those calling for governmental aid for motor bus lines in communities and countries where inadequate facilities now exist; the need for uniform traffic rules and regulations; for progressive studies into city and rural planning in order to allay congestion, and for centralized authority in dealing with highway problems."

"Other sections dealt with the physical side of highway construction and design, including methods of relocating and widening highways, types of maintenance and other engineering problems."

In his survey of existing transport conditions in Europe, Mr. Johnson found that questions of finance, co-ordination of motor with other forms of transport, and that of handling traffic in congested areas are the subjects uppermost in the minds of government officials.

#### BRITISH RAILROADS WOULD OPERATE BUSES

In England for example, he pointed out, Parliament has only recently considered a bill in which the railroad companies asked for powers to operate motor vehicles on the highways, and while the right was denied the general feeling is that the subject has not yet been closed. Other parliamentary bodies are now studying the problem of providing London with new outlets for the ever-growing volume of traffic over the roads; while the question of taxation is under continued study with a view to bringing governmental budget needs into economic relationship with road transport.

Steps in the direction of co-ordinated transport have already been taken with marked success in France, where railways are operating long-distance

service and the automobile supplementary operation.

In Italy, the government is being made in the future to construct and operate highways, and to give a trading company the right to give right to a road operator, that it pay the government the cost of road construction and maintenance.

#### TRUCKS SUPPLY BUS BODIES

In Spain there has been a marked acceleration in modern transport with the result that the bullock cart has already been replaced in a great many cases by the truck.

### Bus Body Builders Organize

**A** BUS body builders' section of the Automobile Body Builders' Association was organized at a meeting at the Hotel Statler, Detroit, on Aug. 21.

The new organization, it is said, will be in effect a national association of bus body builders, many of whom are prominent manufacturers from all sections of the country are members. F. M. Gullison of the Plymouth Wagon Works was elected permanent chairman of the section, and S. H. Gardner of the A. B. B. A. was made secretary.

The meeting is said to have developed the fact that bus body builders had no standard nomenclature for their products, and that in discussing them they each talked a different language. The organization declares its intention of overcoming this.

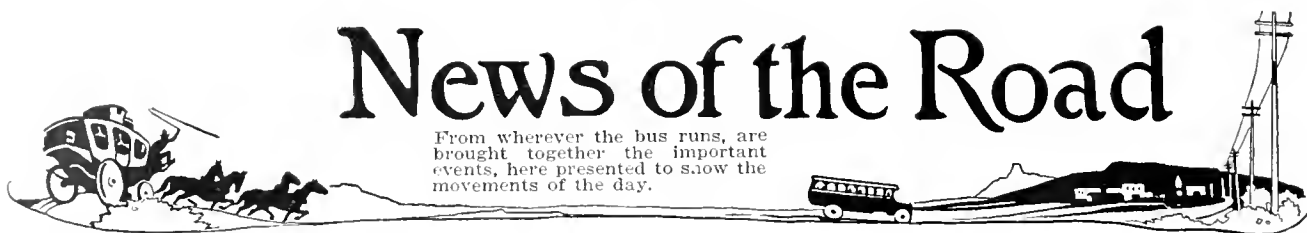
The following questions were discussed and referred to the chairman for action: (1) Dimensional standards for different types and capacities of bodies; (2) dimensional standards for the typical and essential features and parts of each type of body; (3) readjustment of foreign rates; (4) the cause of unfair competition; (5) the recommendation of a form of guarantee against defects.

After an enlightening discussion of "fair trade practices," a committee was appointed to study the subject and submit a "code of ethics" at the next meeting. The personnel of the committee is: William H. Moring, chairman, Hopkin Manufacturing Company, Hanover, Pa.; W. R. Whitfield, W. H. Whitfield & Son, Port Yank, N. Y.; A. R. Keagy, Michigan Body Corporation, St. John's, Mich.

One question discussed at length concerned the way and means of educating the builders who are to continue custom building and at the same time of developing the business of those who manufacture on the quantity basis. An agreement was reached whereby a member receiving an invitation to bid upon a type of body other than those he especially is accustomed to line quantities, will refer the inquiry to such fellow-members as may have previously indicated that they were building that particular type and quantity of body. It was felt that such a course would work to the advantage of the customer as well as to the manufacturer.

# News of the Road

From wherever the bus runs, are brought together the important events, here presented to show the movements of the day.



## Bus Popular in St. Louis

**People's Motor Bus Company Plans to Have Eighty Buses Operating in the City in September**

THE bus is becoming increasingly popular in St. Louis, reports from that city indicate. Several new routes are to be added in the near future to the system of the People's Motor Bus Company, which recently announced that between May 29, the date on which this company started operation in St. Louis, and July 31 more than 880,000 patrons were carried. Of this number 130,000 were carried to and from the Municipal Opera-Theater in Forest Park. The company is now operating seventeen buses on the Washington-Delmar route and in the Municipal Opera service after 6 p.m. The daily average since the opening of operations has been 12,500 patrons, with a steady increase in the total, until now an average of 130,000 pay passengers are being carried weekly.

According to an official of the People's Motor Bus Company, the company is more than pleased with the results obtained in St. Louis, and the principal worry is the lack of motor buses to furnish transportation on new lines which will soon be opened. Richard W. Meade, president and general manager of the company, is said to be making great efforts to accelerate delivery of buses which have been ordered.

The company hopes to have eighty buses in St. Louis in September, when the Grand Boulevard line from Carondelet Park will be started. The installation of this service will meet a great need, it is said. Forty buses will be used on the route, with the balance on the Washington-Delmar line. Later a line will be operated on Lindell and Locust Boulevards, looping in the downtown district with a bus line between St. Louis and East St. Louis, by the way of the Municipal Bridge.

Construction of the \$150,000 garage and assembly plant at South King's Highway and Grand Boulevard is progressing. This structure will be two stories high and will contain 62,000 sq.ft. of floor space. It will be completed in about two months.

### OFFICIALS ACT AS HOSTS TO CITY'S TENEMENT CHILDREN

Children of the various playgrounds of the city are enjoying weekly bus rides this summer as the guests of the officials of the People's Motor Bus Company, in buses which run on Washington and Delmar Boulevard be-

tween University City and the Eads Bridge.

One such joy ride took place recently when children from the Mullanphy playgrounds were loaded into three buses and taken for a ride over the city boulevards, and to Forest Park, where they visited the Zoo. The trip started at noon and lasted until 4 o'clock. Mayor Henry W. Kiel, Park Commissioner Fred W. Pape and Director of Public Welfare Nelson Cunliff accompanied the children. In addition to furnishing the buses, officials of the bus line also supplied refreshments for the youngsters from the tene-ments.

## Railroad vs. Bus in Minnesota

In a hearing held recently before the Minnesota Railroad & Warehouse Commission, the Northern Pacific road, applying for permission to take off ten suburban trains running to White Bear and Taylors Falls from St. Paul and Minneapolis, testified that in the summer buses are accommodating most of the traffic on this line. In the week July 4-10 the White Bear train carried only forty-one passengers paying \$4.95, and the returning train carried 130 passengers, paying \$29.

Protestants appeared from Taylors Falls and intermediate points against removal of specified trains.

## New Jersey Railway Offers to Buy Competing Buses

**Public Service Railway May Become Extensive Bus Operator—Buffalo Franchise Granted International—Buses Replace Trolley System in Brattleboro, Vt. —Philadelphia Rapid Transit to Extend Service**

OFFERING to buy all motor buses competing with its electric railway lines in New Jersey, the Public Service Railway on Aug. 21 made public a plan for a settlement of the strike which has tied up trolley transportation in the northern part of the state and in Camden since Aug. 1.

The company roughly estimates that to carry out its plan for the settlement it would be called upon to purchase between 750 and 1,000 buses operating throughout its territory. The company insists that should such a purchase be effected the licenses of all bus owners who sell to the company and of those having temporary permits shall be rescinded, and the licenses of bus owners who do not desire to sell shall be rescinded or the buses rerouted on streets where there are no street railway tracks.

In the plan the company states that although it never has had a desire to embark largely upon bus transportation, nevertheless the situation which has developed in New Jersey, due to the strike of the company's employees, must be met in a broad way, if local transportation is to survive. Therefore, the railway company, acting through an allied corporation, is willing to purchase at their present fair physical value all buses operating competitively on July 31, 1923 (the day before the commencement of the strike), on the streets where the railway company's tracks are laid whose owners are willing

to sell. The present value of these buses is to be agreed upon, if possible, between the company and the respective owners of the buses. If unable to agree, values shall be fixed by an independent appraisal. This will involve a capital investment of several million dollars, the financing of which has been provided for, according to the company, conditioned upon the adoption of the plan as a whole.

The whole question is now before the Board of Public Utility Commissioners in a public proceeding in which the representatives of the railway, public officials and the bus owners are participating. Feeling seems to be mixed on the part of the local authorities as to the real need of railway service, but the bus owners are opposed to any sale of their property to the railway. The bus men say they are prepared to take over the transportation problem as a whole if guaranteed franchises sufficiently long to permit them to finance the purchase of the additional equipment that would be necessary.

### BUFFALO FRANCHISE GRANTED

The International Railway, Buffalo, has received a permit from the Public Service Commission for the operation of bus lines in Bailey Avenue between Broadway and the North City Line in conformity with the permit granted by the City Council. The company will start the operation of buses along the street at once on a 7-cent cash fare



or four tokens for 25 cents with free transfers. The same rules and regulations as apply to the street cars will apply to the Bailey Avenue buses.

Coincident with the securing of the franchise from the Public Service Commission, the company organized the International Bus Corporation under the laws of the state of New York, with an authorized capitalization of \$100,000. The new company will be operated as a subsidiary of the traction company. The incorporators are H. L. Mack, vice-president of the International Railway, in charge of engineering; Herbert G. Tulley, president of the railway company; R. Harland Horton, vice-president of the railway, in charge of traffic; C. A. Weber and C. A. Cheval.

#### BUSES IN BRATTLEBORO

Residents of Brattleboro, Vt., are now depending on bus transportation exclusively. Buses were installed there Aug. 20 by the Twin State Gas & Electric Company to replace the electric railway system which formerly served the city. Three buses are in use at present—one a twenty-seven-passenger car, manufactured by the Stewart Motor Car Company, and two made by the White Company of Cleveland. The running time from Fort Dummer Heights to West Brattleboro, the extreme points of the line, has been cut from forty minutes to thirty. Buses start simultaneously from both termini and meet at the Brattleboro Common.

Two other New England communities are to have bus service. The Eastern Massachusetts Street Railway recently placed four buses in operation in Revere, Mass., furnishing transportation to the residents of the Malden Street and Park Avenue sections of the city.

Since the removal of the car tracks on these two thoroughfares the localities have been without transportation of any kind. Free transfers are issued allowing passengers to change to the cars of the railway on Broadway. The permit to operate was passed by the Revere City Council Aug. 6.

In the city of Waltham, Mass., some officials of the Middlesex & Boston Street Railway recently investigated the advisability of replacing the trolley service between Newton Center and Newton Highlands with buses. It is considered probable by residents of the section that motor bus service will be given a month's trial. Upon the result of this trial will depend the adoption of the plan on other lines throughout Middlesex County. Residents along the line claim that the electric railway cars make too much noise and that consequently they cannot really enjoy suburban life. A canvass of every household along the line recently made is said to have resulted in a pledge to the street railway that if the bus does not make as much as the electric line has, they will personally make up the difference.

### Stagecoach Hold-ups Are Here Again

ALTHOUGH the old stage drawn by four dusty horses has been replaced by buses, hold-ups are almost as frequent as in the days of 19 and bus companies may be compelled to arm their operators to meet this new menace.

One of the Eastern Wisconsin Transportation Company's passenger buses operating between Madison and Fond du Lac, Wis., has been twice stopped and bandits have attempted to relieve passengers of their money and valuables. There is one objection to the modern business of bus coach robbing, however. The roads are more crowded than they were in the old days. Both times the bandits were interrupted by other cars which came in sight.

A favorite trick of the modern hold-up man is to leave a tire in the road—apparently a good tire. When buses or tourists stop to investigate they are confronted by masked bandits who step from the bushes and relieve them of their valuables. Several small robberies have been effected in this way recently.

Buses are to be given a trial also in Palo Alto, Calif. At the suggestion of the City Council, and after several conferences with railway officials, the Peninsular Railway, which operates the local street car system in Palo Alto and from that city to the campus of Leland Stanford, Jr., University, is to put on three buses. These will operate in different parts of the city and will serve as feeders to the present street car system, transferring to the street car lines. The fare will be 6 cents for local passengers and 10 cents for the trip from the city to the university.

The route covered by each bus is to be about 2 miles in length.

The three cars now being built for the service will have a capacity of twenty passengers each and will consist of Reo chassis on which special bodies have been placed. They are to be in service by Sept. 10.

#### BUSES FOR ARKANSAS TOWNS

In Arkansas the Arkansas Power Company, successor to the Little Rock Railway & Electric Company, is planning to operate a bus line from the end of the company's street car lines at Biddle to Farrell, in the extreme southern part of Pulaski County, 20 miles from Little Rock. The company recently filed an application with the State Railroad Commission for permission to operate this line. The bus route would go via Wrightsville and Woodson and transfers would be arranged with the street cars.

A new policy on the part of Illinois toward interurban lines was revealed Aug. 7 when the Illinois Commerce Commission granted the Illinois Traction, Inc., successor to the Chicago, Ottawa & Peoria Railway, authority to tear up part of its tracks and institute bus service as a substitute for the electric cars. The company is given the right to abandon 3½ miles of track between Hick's Junction and the village of Ladd in Bureau County. Permission is contingent upon the operation by the company of adequate motor bus

service between Ladd and Ladd.

Whether at Ladd, Ill., or on the railway connecting it with Ladd, with the coming of summer the Chicago, North & Milwaukee Railroad has begun a campaign of persuasion for a certain number of lines from Chicago to Ladd, Ill., and in the city of Ladd, Ill., Waukegan Road, then to Greenfield, Wis., to operate between Chicago and the Wisconsin state capital, Janesville, Kenosha, Watertown, Green Bay, Highland Park, Fox River, Lake Bluffs, North Chicago, Waukegan, Zion and Winthrop Harbor.

In Virginia the State Corporation Commission recently entered an order authorizing the Washington & Virginia Railway to operate bus lines in territory contiguous to Alexandria. Among the places to be served are the Virginia Theological Seminary and the Potomac Yards.

#### MORE BUS LINES FOR PHILADELPHIA

Two electric railway companies in Pennsylvania have recently indicated their intention to make extensions on bus systems already operated by them. The Philadelphia Rapid Transit Company has announced preliminary plans for extending its auxiliary bus service to the central business district to relieve the intense traffic congestion, growing more acute daily. Thomas E. Mitten, chairman of the directors, informed the City Council that the company will seek a bus franchise to operate from Sixty-third and Walnut Streets, east on Walnut to Twenty-third Street, north to Sanson, east to Broad Street, south to Locust, west to Twenty-third Street, north to Walnut and west to the point of beginning.

The transit company officials believe these buses will relieve the surface trolley lines as well as the subway under Market Street. So urgent has Mr. Mitten become in advocating the removal of trolley tracks from the central business streets that he has offered to pay sinking fund charges and interest on a municipal loan of from \$18,000,000 to \$20,000,000 for the construction of a subway under Chestnut Street.

This line would carry all of the surface trolleys now operating on Chestnut and Walnut Streets. The city would build the Chestnut Street subway as a municipal enterprise, while the transit company, under the Mitten offer, would pay off the loan. After the Chestnut Street subway is built it is the plan to operate the buses over Chestnut and Walnut Streets in the heart of the congested business district.

The company is prepared for early operation of a bus line over Roosevelt Boulevard to connect with intersecting trolley lines and the high-speed elevated line to Frankford. This service will start early in September with a 10-cent fare and 3 cents additional for

each transfer to the transit company's trolley lines.

The Philadelphia & Westchester Traction Company, a suburban line operating out of Philadelphia, also has planned a bus line as an auxiliary to its present service. The buses will operate from the terminal at Sixty-ninth and Market Streets through Bywood, Highland Park and to Springfield. This is a distance of about 4 miles and is designed to take care of a rapidly increasing population in Delaware County not reached by the interurban's electric lines.

#### BUS LINE EXTENSIONS IN ALTOONA

The Logan Valley Bus Company, a subsidiary of the Altoona & Logan Valley Electric Railway, has made application to run two new motor bus routes in the city of Altoona, Pa., as feeders to the traction line. The company has placed an order for three new Garford buses, similar to ones now in use, the company to have a fleet of five twenty-one-passenger cars.

The new routes will be from the traction company terminus and office to the Fifth Ward and to the Third Ward, no trolleys traversing either section. Half-hour service is planned. Both districts recently petitioned for trolley service.

Across the state line in Ohio the Steubenville, East Liverpool & Beaver Valley Traction Company has started a new bus service in Steubenville, from the business district to the hilltop residence section. A fifteen-minute schedule will be maintained, in addition to a twenty-minute street car service. A cash fare of 10 cents, or three tickets for 20 cents, is charged, a reduction from the street car fare. The bus service is calculated to eliminate the congestion on the interurban car lines. It has been installed as a result of the demand for extra service.

#### Bus Service Extended in Coal Fields

The Pocahontas Transportation Company of Welch, W. Va., has secured from the state road commission a franchise to operate a bus line from Welch through Gary to Thorpe and Filbert in the Pocahontas coal fields. This additional service will begin on or about Oct. 1, according to Carroll R. Woods, president of the company. Three buses will be used on the Gary line and a regular service will be maintained. The Pocahontas Transportation Company will then have in operation eleven buses, an increase of eight since the company first started operating a year ago. Preparations are being made to establish a garage and shop at Wilcoe, where mechanics will be stationed to keep the buses in condition.

In addition to the regular passenger service on the Gary line, the Pocahontas Transportation Company has entered into a contract with the Board of Education of Gary District to carry

the students of the Gary High School to the homes at Wilcoe, Havaco, Thorpe and Filbert. This means that transportation will be provided for at least 200 children every day except Saturday and Sunday.

In connection with the development of bus transportation in southern West Virginia, some of the larger coal com-

panies operating in the Pocahontas region have adopted the plan of conveying their miners to and from work in buses. That plan was adopted by the American Coal Company some time ago and has done much to cement the friendly relations existing between the company, its employees and their families, it is said.

## British Bus News Summarized

London Traffic Condition to Be Improved by Parliament Bill—Omnibus Accidents Increasing Change in Permit Granting Policy Made by Parliament—Drop in Price of Gasoline Cheers

THERE is a prospect of dawn at last after the night of chaos in the London street traffic problem. On Aug. 2, the last day of the Parliamentary summer session, Colonel Ashley, Parliamentary Secretary to the Ministry of Transport, announced in the House of Commons that in the coming autumn session he would introduce a bill to deal with the subject of London traffic. For the last forty years or more the problem has been growing more and more acute. Royal commissions and Parliamentary committees almost without end have been appointed to investigate the subject and make proposals. For the most part they recommended some sort of central authority to regulate, co-ordinate, and even in some cases to carry out executive powers. Nothing ever came of these proposals, as no government saw its way clear to give effect to them by legislation. Political animosities, jealousies of local authorities (a hundred or two of them in Greater London), the fear they had of being deprived of any of their existing powers—these and other considerations prevented anything being done. Two or three officially appointed bodies within the last few years resumed the inquiries of former times, and the latest of these was a royal commission on London government. Since the war a special act of Parliament constituted the Ministry of Transport with wide powers, and the Ministry submitted evidence before the London Government Commission, the chief features of which are to be embodied in the promised bill. Sweeping aside old proposals, the scheme is that the Ministry of Transport (which is a department of the government) will be the traffic authority within a radius of 25 miles from Charing Cross, and that it will be assisted by a statutory advisory committee of sixteen members representing the local authorities, the underground railways and omnibus companies, the users of commercial vehicles, and the Transport Workers Union. While the details have not yet been published, it seems fairly clear that the controversy will arise as to the powers entrusted to the Transport Ministry and as to the composition of the advisory committee. However the matter may be settled, it is something to the good that a government proposal is being brought forward.

Another aspect of the London street traffic problem is the enormous number of accidents, fatal and otherwise. In spite of the safety first campaign, the number is increasing, as shown by an official statement issued by the Commissioner of Metropolitan Police early in August. This statement says that the commissioner is viewing with much concern the increase in the number of traffic fatalities which occurred during the months of January to April, 1923. In that period there has been an increase of twenty-two people killed, as compared with the corresponding period of 1922. The fatalities caused by motor omnibuses have risen from nine in the first four months of 1922 to twenty-two in 1923, while those attributable to trade and commercial vehicles have risen from sixty-two to eighty. The commissioner further says that it must be apparent that drivers should have far greater regard for the provisions of the law with respect to dangerous, reckless, or negligent driving. The commissioner has directed the police to check by all means in their power fast and dangerous driving, and he hopes that employers will see that their drivers are duly warned and instructed, and that all drivers will see to it that no act of theirs shall be the cause of danger.

In the matter of licensing buses a new and somewhat startling situation has arisen owing to the House of Commons passing a certain clause in a private bill promoted by Stoke-on-Trent Town Council. In the ordinary way, if a local authority refuses to grant licenses for the running of buses, the applicants can appeal to the Ministry of Transport, which on good cause shown can override the decision of the local authority. In Stoke-on-Trent and neighborhood the tramways are not operated by the municipality but by private companies, while buses are run by other companies.

The three parties concerned evidently came to an agreement which resulted in the Town Council including a clause in the Parliamentary bill of this year which gives to the local tramway companies a right of appeal to the Ministry of Transport against a decision of the Town Council on any application for licenses to new buses to be run on any tramway route.

It was pointed out by those who op-

The price of motor spirit (petrol or gasoline) was further reduced in Great Britain on July 19 by 3½d. per gallon. This means that the price of No. 1 is now 1s. 8½d. and of No. 2, 1s. 6½d. Refined oil is reduced by 1d. The fall in price is reported to be a reflection of the reduction in oil prices which has taken place in the United States owing to overproduction.

Year	Fines Started
1990	100
1991	100
1992	100
1993	100
1994	100
1995	100
1996	100
1997	100
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2001	100
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2142	100
2143	100
2144	100
2145	100

Permits Granted		
Company	Address	City
J. N. Corwin	Newburgh, N. Y.	Greenburgh, N. Y.
Walter K. Johnson	Turkey, Utah	Turkey, N. Y.
Galva Bus Line	Galva, Ill.	Galva, Ill.
Applegate & Holman	Stockert, Mont.	Greenfield, N. Y.
L. Clay Fisher	Nantux, N. Y.	Greenfield, N. Y.
J. W. Mitchell	Middleton, Wisconsin	Greenfield, N. Y.
Zurich Bros.	Lugomer, Pa.	Greenfield, N. Y.
L. H. Turner	Pittsburg, Pa.	Greenfield, N. Y.
James Stanton	Hammond, N. Y.	Greenfield, N. Y.
Anthony J. Franklin		Greenfield, N. Y.
United Bus Co.		Greenfield, N. Y.
United States Service Corp.		Greenfield, N. Y.
Healy Bros.	Candlen, N. J.	Greenfield, N. Y.
F. M. Skold	Vineland, N. J.	Greenfield, N. Y.
Peter Dennis	Minot, N. D.	Greenfield, N. Y.
Red Trail Transfer Co.	Bismarek, N. D.	Greenfield, N. Y.
Western Transit Co.	Minot, N. D.	Greenfield, N. Y.
Interstate Transportation Co.	Bismarek, N. D.	Greenfield, N. Y.
William S. Rohrer	Bismarek, N. D.	Greenfield, N. Y.
C. A. Johnson	Manlan, N. D.	Greenfield, N. Y.
Gardner & Christensen	New England, N. D.	Greenfield, N. Y.
J. H. Wademan	McKenzie, N. D.	Greenfield, N. Y.
Washington & Virginia Railway Co.	Washington, D. C.	Greenfield, N. Y.
Merrell George	Herkimer, N. Y.	Greenfield, N. Y.
C. M. Pitts	American Fork, Utah	Greenfield, N. Y.
Farrar & Anzalone	Hughestown, Pa.	Greenfield, N. Y.
Perazzo Bus Line, Inc.	Patchogue, L. I.	Greenfield, N. Y.
Howard A. Barber	Waterville, N. Y.	Greenfield, N. Y.
Wesley D. Steward	Cortland, N. Y.	Greenfield, N. Y.
W. E. Oster	Eureka, Utah	Greenfield, N. Y.
Salt Lake Transportation Co.	Salt Lake City	Greenfield, N. Y.
Yorda McKee	Holden, Utah	Greenfield, N. Y.
J. C. Russell	Lehi, Utah	Greenfield, N. Y.
Old Trails Bus Line, Inc.	Umontown, Pa.	Greenfield, N. Y.
McMahon & Felmeth	Monessen, Pa.	Greenfield, N. Y.
H. W. Leyh	Fort Pitt, Pa.	Greenfield, N. Y.
James Davoli	Umontown, Pa.	Greenfield, N. Y.
Smith & Cossna	Bradford, Pa.	Greenfield, N. Y.
Wolberg & Otto	Altoona, Pa.	Greenfield, N. Y.
Miller & Coatsworth	Monroe, Pa.	Greenfield, N. Y.
Miller & Nolt	Corapolis, Pa.	Greenfield, N. Y.
Oppman & James	Connellsville, Pa.	Greenfield, N. Y.

Incorporations	
Camden Motor Bus Co.	East Liverpool, Ohio
Howard Beach-Woodhaven-Bayview Bus Co., Inc.	30 E. Broadway, New York City
Yellow Legs Transportation Co.	Bozeman, Mont.
Blue Ridge Transportation Co.	Huntsville, Ala.
New London & Nantuxet Motor Transportation Co.	New Bedford, Mass.
Nome-Southwestern Bus Co.	Nome, Alaska
Inter-Urban Bus Line, Inc.	New York City
Clarion Bus Co.	Clarion, Pa.
Manhattan Bus Corp.	37 W. 57th St., New York City
Buffalo Southern Co.	100 E. Main St., Buffalo, N. Y.
S. B. Lane Motor Bus Line	Empire, N. Y.
Pullmanville-Martins Ferry Bus Co.	Martins Ferry, W. Va.
Chevermont-Ravena & Albany Bus Line Co.	Albany, N. Y.
Ranchwenger Bus Co.	61 E. Main St., Albany, N. Y.
Jefferson, Ashland & Central Transportation Co.	Albany, N. Y.
Western Bus Co.	Portland, Ore.
Riddle Motor Bus Corp.	Portland, Ore.
Herzog Motor Bus Transportation Co.	Portland, Ore.
Simpson Motor Bus Co.	Clatskanie, Ore.
Northern Red Star Line	Medford, Ore.
National Bus Co.	Newark, N. J.
Orlando Bus Co.	Orlando, Fla.

## Supreme Court Acts on Schenectady Jitney Tangle

The Schenectady, N. Y., jitney tangle is more involved than ever. Supreme Court Justice John C. Crapser, in a special term of the Supreme Court at Canton, N. Y., on Aug. 25, granted the motion of the attorneys for the Schenectady Railway that the order of Supreme Court Justice Edward N. Angell restraining jitney drivers from operating parallel to the company's lines be continued during the trial of the case. An outline of the events leading up to Judge Angell's order appeared in BUS TRANSPORTATION for August.

Attorneys representing the jitney men, whose activities are an outgrowth of the recent Schenectady trolley strike, opposed the motion on the ground that the city of Schenectady licensed the operation of jitneys. Company attorneys also made a motion on an order to show cause why the defendants should not be punished for contempt in disobeying the Supreme Court injunction. Justice Crapser interposed with the suggestion that the opposing factions come to an agreement before proceeding. After a conference of attorneys it was agreed with Judge Crapser that an adjournment be taken for one week and that the injunction provisions be explained to the jitney men.

## Maine Commission Refuses Bus Permits

The Maine Public Utilities Commission recently handed down a decision refusing to grant licenses for bus operations between Portland and Old Orchard. The applicants were in competition with a steam railroad, the Boston & Maine, and an electric railway, the Cumberland County Power & Light Company, lessee of the Portland Railroad Company. In dismissing the application the commission said:

"Competition, which adds life and force and incentive to ordinary industries, cannot truthfully be said to be desirable in the conduct of public utilities, which, in their nature, although owned by private individuals, are dedicated to the use of all the citizens of the community. Public utilities must, of necessity, be limited in number in any given community in order to be at all remunerative and hence able to attract capital for maintenance and development."

## Bus Serves Bathing Beach

Flexibility in the use of buses is well illustrated by the summer service of the Houston-Galveston Transportation Company, which operates on a route between these two Texas cities. There is a very popular bathing beach near Galveston to which the people of Houston flock during the summer months, and most of the passenger traffic from May 1 to Oct. 1 consists of Houstonites bound for the beach. There are three ways of traveling from Houston to Galveston—by train, inter-

urban trolley, and bus. The bus line alters its route during the summer and enters Galveston by the famous Seawall Boulevard, the thoroughfare that runs along the surf line, thereby enabling passengers to alight at any point along the beach which suits their fancy. The bus then continues into the city proper. The trains and trolleys terminate in the downtown section of the city, some distance from the beach. As a result, the bus line gets a large part of Houston-Galveston traffic.

George L. Seidelman is president of the company. Four Fageol safety coaches are now in service between the two cities. The trip of 56 miles is made in an average of two hours and ten minutes. Buses leave each city every hour and a half from seven o'clock in the morning until midnight.

## Bus Injunction Not Served

Buses are still being operated in New York under the supervision of the Department of Plants and Structures. They are running at present only because Louis Marshall, the lawyer holding the injunction against them, has further put off service of the court's restraining writ. He hopes that the city will act in accordance with the suggestion to have operation legalized through the granting of revocable franchises. The attitude of the city administration is that it would pass out of the picture as to its power over the buses once the matter were put before the New York Transit Commission. As to the suit brought by Mr. Marshall, it is pointed out that if the Board of Estimate were to issue the franchises as a preliminary to the issuance of certificates of necessity by the commission this will obviate the need for the service of the court's order, which would halt 400 owners. The authority of the buses to operate is now informal.

**Rochester Trackless Trolley Permit Granted.**—An ordinance authorizing the operation of trackless trolleys on a cross-town route in the city of Rochester, N. Y., for a four months trial period was passed by the Common Council on Aug. 28. The ordinance permits the Rochester Railways Co-Ordinated Bus Lines, Inc., to operate the route from Sept. 5 to Jan. 5, 1924. The bus company is a subsidiary of the New York State Railways.

**Blue Ridge Bus Line Incorporated in Maryland.**—Articles of incorporation for the Blue Ridge Transportation Company have been filed with the State Tax Commissioner of Maryland. The incorporators are: E. V. Hull, Alexander Armstrong, J. Cleveland Grice, Cyrus F. Flook, Dr. H. L. Kneisley, Paul R. Smith and Augustus Ludwig. The company will have a capitalization of \$200,000, divided into 2,000 shares of a par value of \$100 each. E. V. Hull, who has developed the Hull Bus Lines, will be the general manager of the company.

## Chinese Firm to Operate Buses in Hongkong

China's traditional dislike for western importations does not hold true in the case of the motor bus. A company was recently incorporated there under the Hongkong companies act for the purpose of operating buses and is inviting local subscriptions for 47,500 shares of stock at 10 taels each. A tael is worth about 84 cents in American money. The local City Council, it is said, has sanctioned the operation of buses on ten routes, and should it be found necessary to extend the service the approval of the Council is assured.

The company's technical expert, the prospectus states, will immediately visit England and the United States to arrange for the purchase of thirty buses and to secure an expert traffic superintendent and maintenance superintendent so that the operation of the proposed service may be as perfect as skilled experience can achieve.

The routes of the buses will include not only main streets of the city but will run out the avenues into the residence district and will, it is expected, greatly reduce the number of rikshas in the locality. A special feature of the service will be the "tiffin (luncheon) buses," which will carry business men home for their midday meal and bring them back to their offices at 2 p.m. It is the custom in all Chinese cities, in the summer time especially, to shut down business at 12 o'clock and reopen at 2, to avoid the noonday heat.

## Southern Pennsylvania Bus Line Asks Permit

The York Transit Company, York, Pa., has filed an application with the Public Service Commission at Harrisburg for the right to operate a bus line from Red Lion to Stewartstown. If the commission grants this license it will be the second route operated by this company. The proposed line will be over State Highway Route No. 332, at present under construction, and will pass through Winterstown, which has been without public conveyance since its incorporation. The line will be started as soon as a certificate has been obtained from the commission and the highway is completed. This route is one of the most important in York County as it will be the means of furnishing transportation through a thickly populated country which has heretofore been in a measure cut off from York. The bus lines will connect with the York Railways line at Dallastown and the Pennsylvania Railroad at Stewartstown.

**Tennessee Bus Line Now Operating.**—The Nashville-Springfield Bus Line of Nashville, Tenn., began operation recently over a 30-mile route between those two cities. Two International speed buses, seventeen-passenger capacity make three round trips daily. John T. Nolan is owner and operator of the new line.



In his speech Lord Ashfield pointed to the falling off in the total number of passengers carried by the underground railways of London from 339,000,000 a year in 1921 to 325,000,000 in 1922, or a decrease of 4 per cent. He attributes this to the general industrial depression which, he says, is slowly being overcome.

#### IMPROVEMENTS IN OMNIBUSES

According to the managing director, the "B" type of bus is rapidly disappearing from the streets of London, giving place to the "S" type seating fifty-six. The company is now building the "N.S." type, which, says Lord Ashfield, is as great an advance on the "S" type as the "S" type represented over the "B." He also stated that the progress made in omnibus design has adversely affected the traffic on the underground railways.

#### DANGERS OF COMPETITION

In speaking of the bus situation in London, the managing director referred to "certain odd omnibuses appearing upon the streets in coats of many colors." At the moment, he stated, there is no serious competition, but without doubt these newcomers presented a great menace to efficient transportation. He pointed out that London's prosperity depends on the co-operation of many kinds of transportation, all operating in the closest harmony, and urged that some responsible and judicial authority be instituted to supervise the development of London's traffic facilities, such as is maintained by New York, Paris and Berlin, where traffic development comes by design and not by accident.

"Competition," he said, "causes congestion on the more remunerative routes, destroys reliable service on the less remunerative routes, and destroys service on unremunerative routes. Competition ends in obsolete vehicles being retained in service when they should have reached the scrap heap, and this means poor service.

"It is a question for Londoners which they will have to solve," he added, "it cannot be a question for us. We shall do our best as we are able—we cannot do more. If we have the confidence of the public, all is well. We shall not fail to deserve it."

#### Ohio Bus Line Declared Bankrupt

The Dayton, Hamilton & Cincinnati Rapid Transit Company, Cincinnati, Ohio, was adjudicated bankrupt on Aug. 13 by the United States District Court for the Southern District of Ohio, Western Division.

John A. Payne, president of the company, who had previously filed a voluntary petition in bankruptcy for the firm, listed assets at \$34,120 and liabilities at \$29,552. The assets are made up of ten buses valued at \$33,620 and tools and equipment valued at \$500. Although the assets are larger than the liabilities on paper, it is expected they will be

reduced considerably through actual liquidation. Mr. Payne also filed a petition asking the court to appoint a receiver. Charles T. Greeve of Dayton has been appointed. The Dayton, Hamilton & Cincinnati Rapid Transit Company, organized more than two years ago, operated lines connecting Cincinnati, Anderson's Ferry and Oakley. The company was one of the first to enter the bus business there on a large scale.

#### Fare Increase Denied

**Commission Rules Washington Rapid Transit Company Is Not Entitled to ten-Cent Fare**

**P**ERMISSION to increase fares on the bus lines of the Washington Rapid Transit Company, Washington, D. C., was denied by the Public Utilities Commission of the District of Columbia on Aug. 17. The company requested authority to raise the fare from 8 to 10 cents. The commission declared that the net results of the company's operation shows a profit.

It was contended by representatives of the company that the existing rate had proved inadequate to provide a fair return on its invested capital over the period of two years and five months during which its operations have been carried on, to provide proper salaries for its executives, to enable it to replace its original equipment, which it characterizes as obsolete, with equipment of a newer and more modern type and to enable it to write off its organization expenses.

#### COMMISSION HAS FULL AUTHORITY

Representatives of the Federation of Citizens' Associations, on the other hand, contended that the commission could not consider the application for a modification of the rate of fare until such time as it had made a formal determination of the fair value of the company's property; that the charges for depreciation and insurance reported by the company were excessive, and, not having received the formal approval of the commission, should not be allowed, and that the present rate of fare was excessive and should be reduced.

The commission, after careful consideration of the provisions of the act under which it was created, decided that it had full authority to consider, and, if it deemed proper, to act upon the application under consideration.

In justifying its refusal to authorize a fare increase, the commission said: "An examination of the books of the company, verified by the sworn statements of its operations, as submitted to the commission, shows that the company has been able under the present rate to set up a depreciation reserve for the retirement of the capital invested in buses on the basis of a life of three years, amounting to \$80,098.48 on June 30, 1923, that ample depreciation reserves have been set up for the retirement of other equipment; that repairs and maintenance of buses and

equipment have been made when needed, \$26,098.43 having been spent for this purpose during the calendar year 1922; that working capital, in the form of tires, tubes, stock repair parts and other materials and supplies, as of June 30, 1923, amounted to \$26,480.94; that all operating expenses and taxes have been met, as well as all general and miscellaneous expenses, including ample allowances for insurance; that the net results of operation show a profit, after the payment of interest on borrowed money, and that the passengers carried show a steady increase in traffic, a condition which should continue, in view of the efficient service given by the company.'

#### Weekly Pass Installed in Richmond.

—In an effort to overcome jitney competition, the Richmond Rapid Transit Company, operating buses in Richmond, Va., recently instituted a weekly pass on its lines there. The price of the pass is \$1 and it entitles the holder to as many rides as he cares to take on the buses during the week. The fare for a single trip is 8 cents. The system was introduced to the residents of Richmond by a thorough publicity campaign, including a house-to-house distribution of a circular entitled "Own the Bus Service for \$1 a Week."

#### Seeks \$1,000 Yearly Tax on Buses.

—An attempt to convince the city of Detroit that an annual tax of \$1,000 should be levied on all buses operating over the city streets was made recently by Joseph A. Martin, Commissioner of Public Works there. This should be done, he says, to help pay for the damage done the pavements of the city by heavy motor buses. The present 1-cent-a-mile tax on buses of more than ten-passenger capacity brings the city about \$10,000 a year, and the proposed tax, Mr. Martin believes, would return about \$200,000. The widening and resurfacing appropriations of the city amount to \$1,200,000 a year, it is said. Pavements along the routes used by the buses are showing the wear of this transportation, especially at stopping places, according to Mr. Martin.

**Chicago Motor Coach Revenue Increases.**—Substantial increases in the revenue of the Chicago Motor Coach Company are indicated in the firm's financial statement for July. Earnings of operation for the month were \$279,061, as against \$104,299 for July of last year. Approximately 2,790,164 passengers were carried, as compared with 1,042,991 for July, 1922. Records were established for numbers of round trips and total revenue mileage. Round trips totaled 28,623 and the total revenue mileage 496,283. Coaches totaling 113 were operated by the company in July and fifty-five in the same month last year. Total revenue mileage increased 138 per cent and number of round trips 129 per cent. Fifteen new buses were to be added to the equipment during August. Earning capacity of the individual buses has also increased, it is said.



# Bus Regulation



## City Councils Pass Bus Rules

The tendency toward regulation of buses in the large cities of the country continues. The City Council of Omaha, Neb., recently passed an ordinance providing that application for new bus lines shall be made to the City Council and that each permit shall express terms and conditions of the grant, the situation of the terminal and the location of the route, frequency of service and stopping points, and other terms and provisions deemed advisable. Permits are to run for one year, and the Council shall designate the hours of the day and time during the day when service shall be rendered. Drivers are to be examined and licensed by the Police Commissioner. The maximum fare for one ride shall be 10 cents and a fee of \$15 shall be charged for each permit. If the applicant company is an outside corporation a bond of \$10,000 must be furnished to insure the maintenance of a local representative.

In the matter of liability, the ordinance stipulates that the policy shall be of the standard form of automobile liability, it shall provide for a continuance against indemnity in the amount of \$5,000 for injury or death of any person and a total liability of not more than \$150,000 as the result of any one accident.

Topeka, Kan., is also trying its hand at bus regulation. An ordinance recently presented to the City Council provides that all bus companies operating between fixed points into and through Topeka be forced to pay from \$100 to \$300 in the nature of an annual license. The companies are also forced to carry liability insurance, to come to a stop before crossing Topeka boulevards and railway tracks, to guarantee the operation of their coaches on a definite schedule, and to file their regular schedules at the city hall.

The first step in what is said to be an effort to compel bus operators in Astoria, Ore., to provide their own depots in the city was taken recently when the city commissioners instructed the city attorney to prepare an ordinance preventing motor buses from using any streets of the city for the loading or unloading of passengers.

Efforts at bus regulation in London, Ohio, on the other hand, have received a temporary setback as a result of County Judge Roscoe G. Hornbeck's decision ruling that the London bus ordinance of July 14, 1922, providing for a license fee of \$200 a year for each bus operated through the city and an indemnity bond of from \$10,000 to \$50,000 was exorbitant and the sections imposing these provisions invalid.

The decision was given in the case of the drivers of the Red Star Bus Transportation Company against the

village of London, appealed to the Court of Common Pleas from the court of Mayor E. S. Gordon of London. The Red Star drivers, seven in number, had been given a fine of \$100 and costs in the court of Mayor Gordon for alleged violation of the bus ordinance in failing to pay the license fee and provide the indemnity bond.

Motion for a new trial has been filed on behalf of the city of London by City Solicitor H. H. Crabbe, who has been instructed by the City Council to prosecute the case to the Supreme Court if necessary in order to make the provisions of the ordinance stand.

## Bus Line Authorized Despite Railway Opposition

Despite opposition by the Public Service Railway of New Jersey, the State Board of Public Utility Commissioners recently approved the application of the United Service Corporation to operate two buses between Camden and Turnersville, N. J.

Certain restrictions are imposed by the board governing the operation of the buses, the routes of which follow the lines of the Public Service Railway for some distance in Camden.

It has been agreed that the bus operators will not accept passengers who begin and end their trips at any point between the Philadelphia & Reading station in Camden and the city line.

## Interstate Bus Lines Not Subject to Double License Fee

Interstate bus lines operating between Virginia and West Virginia cannot be subject to a special interstate license tax, according to statements issued recently by the authorities of the two states.

Complaints were being made, it is said, by West Virginia bus operators that they were being taxed for operation in Virginia, while Virginia firms operating in West Virginia were immune from special tax.

Such a complaint was officially presented to the Tax Commissioner of Virginia, Grant P. Hall. In an announcement issued recently on the subject Mr. Hall declared that the interstate bus and truck business was clearly protected from special interstate tax by the commerce clause of the Federal Constitution and that the state of Virginia could not impose a license tax upon West Virginia buses entering the state.

Tax commissioners of the two states have issued orders that no license tax be levied on interstate buses.

**Buses Must Stop Before Crossing Tracks.**—Buses operating in Oregon are now required to come to a full stop before crossing any railroad track by an order issued recently by the Public Service Commission of that state, which further ruled that buses be so loaded that the emergency seat next the driver shall be the last one filled.

# Book Reviews



## Automotive Ignition Systems

By Frank Nayer, M. A. Instructor in Sheet Metal Work, New York Public Schools. Published by F. P. O. Book Company, Inc., 239 West Thirtieth Street, New York City. Sixty pages, 6 x 9 in. Thirty-one illustrations.

The preface of the book makes the statement that it was written with the needs in mind "of the men who have to install, adjust and repair ignition systems in the factory and repair shop, as well as the automobile owner who desires a better understanding of the principles and construction of the modern ignition system." The book is given an added practical value by the inclusion of a number of systems no longer manufactured, but many of which are still to be found in operation.

The general scope of the work is illustrated by the chapter headings, which are: Principles of electricity and magnetism, ignition batteries, jump-spark ignition system, modern battery ignition systems, low tension magneto, armature types of modern high-tension magnetos, inductor types of modern high-tension magnetos, care and repair of ignition apparatus, and ignition troubles and remedies.

The book is clearly written, and the authors are to be complimented upon their treatment of the elementary principles of electricity, which are given concisely, but still so as to be easily understood by the non-technical reader. A great deal of space naturally is devoted to descriptions of apparatus, but this is well supplemented by information showing methods of testing and maintenance. The illustrations are particularly valuable; wiring diagrams, cut-open and phantom views, horrible examples showing what happens to apparatus not properly cared for, are used in large numbers.

## Automobile Pattern Drafting

By Frank Nayer, M. A. Instructor in Sheet Metal Work, New York Public Schools. Published by F. P. O. Book Company, Inc., 239 West Thirtieth Street, New York City. Sixty pages, 6 x 9 in. Thirty-one illustrations.

This book contains a short course of instruction in laying out patterns for the sheet metal work ordinarily required for passenger automobiles. The patterns are given in blueprint form and also are reproduced in small size in the book itself, accompanied by instructions for laying out such parts as cowls, mud guards, hoods, seats, etc. In introducing the subject, the use of metal work in modern automobile construction is explained, as are also the general principles of sheet metal pattern drafting. Painting and finishing methods are described for the benefit of the sheet metal man who must watch his work with the rest of the vehicle. In the last chapter are tables, giving weights of sheet metal, capacity of cylinders, and other information valuable to the sheet metal worker.

# Personal Notes

## Costs Count

**New York Operator Sees Great Need for Accurate Data as Determining Factor in All Bus Operation**

**M**ORE than 100,000 passengers are carried in and out of Hornell, N. Y., every year—and Neil H. McGreevy's buses carry a large part of them. This figure of 100,000 is, of course, relative. Considering that the population of Hornell is a little more than 16,000 it really means more than a larger figure would elsewhere. In other



N. H. McGreevy

words, as a measure of saturation in transportation the record of the McGreevy buses speaks volumes for the extent of the prosperity of a bus service in a small community.

Coincident with the appearance of the first jitneys on the Pacific Coast in 1914—and they really marked the beginning of the use of the bus to any extent in local transportation in the smaller communities—the idea of the use of the auto for public transportation locally at Hornell came to Mr. McGreevy. Moreover, he acted at once upon the impulse. Thus in 1914 he formed a company to transport passengers by bus from Hornell to Alfred, a one-way distance of 12 miles. At that time the idea of transportation by bus over a fixed route was very new to the traveling public in the East, but the service established by Mr. McGreevy proved popular from the very first. In fact, the success of the line led Mr. McGreevy in 1917 to install a service from Hornell to Wellsville, 28 miles. Travel by bus begets more travel, and while it might appear that after several years of operation of lines of this kind a point would be reached beyond which it would be difficult to increase patronage, there seems to be no end to the

increasing popularity of the lines run by him.

From the very first Mr. McGreevy realized that the future of the bus rested more than anything else upon the dependability of the service furnished. Therein lies the principal reason, perhaps, for the success of his lines. After dependability come the elements of safety, comfort and speed. These are first considerations from the standpoint of the public. Then come minor refinements. Of these the McGreevy lines have many. As for the operator, Mr. McGreevy sees his greatest need to be an accurate knowledge of the exact costs of rendering service. This topic of cost accounting for bus lines has become almost a fetish with him. It has been a favorite subject with him at every meeting of the members of the New York State Bus Owners' Association. He will swap stories of accounting experience anywhere, any time with any bus operator. This has always been the McGreevy way. It is this talent for mixing that caused the bus operators of New York to elect him as an officer of their association. It is the same quality that has advanced him to the post of exalted ruler of the Hornell Lodge of Elks. He has also served as a commissioner of the local Board of Public Works.

The expression "as friendly as an Elk" really means something in Mr. McGreevy's case. He is gladsome without being garrulous, gracious without being gushing, and graceful without being gorgeous.

In addition to the offices which have just been mentioned Mr. McGreevy has been president of the local Chamber of Commerce at Hornell. He is also a successful merchant, the principal owner of one of Hornell's leading stores. Doubtless it is Mr. McGreevy's experience as a merchant that has led him to apply to his bus operations so many good ideas of merchandising and at the same time has made him almost impatient to know the exact cost of rendering service to the public. There is nothing niggardly, however, in the McGreevy policy. He is merely after the facts. In the last analysis, facts fix the measure of any service that can be rendered to the public for pay. Mr. McGreevy's experience as a merchant early taught him this. Hornell knows that Mr. McGreevy will give them value received and a little more. Neil McGreevy is a native son of Hornell. He was born there in 1885. Hornell has patronized the McGreevy enterprises generously and Mr. McGreevy has in turn been generous to Hornell. That also is the McGreevy way.

## Stephens L. Blakely Elected President of Dixie Traction Company

Stephens L. Blakely has recently been elected president of the Dixie Traction Company, Covington, Ky., which operates a motor bus line from Fort Mitchell to Erlanger and Florence. Mr. Blakely, who is an attorney by profession, had his attention called to the commercial possibilities of bus transportation through the fact that residents of Erlanger and Florence had been clamoring for many years for adequate transportation facilities between their municipalities and Covington. Conditions would not permit the South Covington & Cincinnati Street Railway, Covington, to extend its Fort Mitchell line to those municipalities, so Mr. Blakely and several other Covington business and professional men conceived the idea that bus transportation would solve the problem.



S. L. Blakely

A year ago Mr. Blakely completed a six-year term as attorney of Kenton County. He is a prominent worker in the civic and industrial organizations of northern Kentucky. The Dixie Traction Company started operating last year with three buses, and according to Mr. Blakely the project has proved a great success. The company contemplates adding several more buses late in the fall.

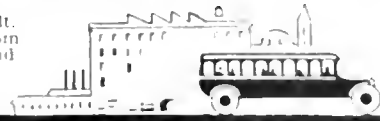
## Railway Bus Manager

J. A. Birmingham, manager of the bus lines of the Pacific Electric Company, operating in southern California, has the responsibility of looking after the schedule, overseeing the maintenance of buses and directing all matters pertaining to operation.

In 1906 he became identified with the railway, serving as conductor on the Northern Division and then as guide on the company's Old Mission Trolley Trip. In 1917 he entered the general passenger department as traveling traffic inspector, and was promoted to traveling passenger agent in 1919. He was appointed manager of the Pacific Electric Railway's bus service in August, 1922.

# Business Information

What is being  
bought and built.  
Latest news from  
the factories and  
the field.



Market conditions  
affecting the bus  
industry.  
Price changes in  
important  
commodities.

## \$1,000,000 Company to Build Buses

Royal Motor Coach Company of New Jersey to Begin Quantity Production Soon, Say Officials

THE Royal Motor Coach Company, Inc., has been organized in New Jersey for the purpose of manufacturing buses. The company is capitalized at \$1,000,000, with \$500,000 of preferred stock and \$500,000 of common. The promoters of the concern are: C. Easman Jacobus, president of the Butler-Newark, N. J., Bus Lines, Inc., the Boonton-Mountain Lakes Motor Bus Line, Inc., and the Trackless Transit Company, Inc.; Ralph De Camp, president of the De Camp Bus Lines, David Peters, president of the Elizabeth-Rahway Bus Line; Mark A. Smith, formerly sales and advertising manager of the Ace Motor Coach Company, and F. G. Alborn, recently chief engineer in charge of manufacturing Ace Motor Coach Company.

The new firm will build both body and chassis. On the Model A twenty-nine-passenger suburban type motor bus a 21-ft. 3-in. body with head clearance of 6 ft. 4 in. will be the standard.

C. E. Jacobus, president of the corporation, has for the past seventeen years been very active in the automobile business in New Jersey.

Mark A. Smith, vice-president and general manager of the company, is well known for his activities in the Society of Automotive Engineers. Mr. Smith started in the automobile business in 1903 as a draftsman on engines and was with several important automotive concerns, both in engineering and sales work, until the World War. Following the war he applied himself to bus work, on which he is considered one of the best posted men in the country.

F. G. Alborn, vice-president of engineering and manufacturing, supervised the production of the first Locomobile racing car in 1905. In 1907 the racing car he designed won the Vanderbilt Cup Race and his work with the Locomobile Company over a period of nineteen years is already automobile history.

H. C. Pray, secretary, is another vet-

eran in the automotive industries. He has been associated with the Pages-Detroit, Lozier, Oneida trucks and the Ace Motor Coach in purchasing work. He will also direct purchases.

It will be about thirty days before quantity production on the Royal Motor Coach will be under way, it is said.

## No Cut in Tire Prices, Say Trade Experts

No decline in the price of tires is in sight, according to expert analysts of the tire industry. Recent rumors of a price cut seem to have been entirely dispelled. The market's future fluctuation can be determined only partially, they say, but a greatly reduced world's supply of rubber would indicate that in the long run prices will not drop.

As to the present situation, the tire manufacturers, having accumulated heavy stocks of tires, have taken steps to reduce their output. Announcements from various rubber districts indicate a reduction in working forces, and although the layoffs in some instances are larger than the industry expected, and have been quite extensive in certain plants, they are not considered serious, it is said, and are looked upon as temporary expedients for preventing the danger of overproduction.

Under normal conditions a large part of the tires now in the hands of manufacturers would be on dealers' shelves. The price situation, however, has been so unsettled in recent months that retailers have become extremely cautious, buying practically on a day-to-day basis.

## Bus Exhibits at A. E. R. A. Convention Increase

An increase of 33 per cent over last year in the number of bus and bus equipment manufacturers who will exhibit at the annual convention of the American Electric Railway Association at Atlantic City, Oct. 8-13, indicates the added interest electric railways are taking in bus transportation. Although convention time is a month away, twenty-one manufacturers have already contracted for space. They are:

## Gasoline War Stirs Entire Nation

The gasoline war has been raging since the first of August. It was started by the Standard Oil Co. of America, which has been fighting a large battle of the price of oil. The Standard Oil Co. has been fighting a large battle of the price of oil. The Standard Oil Co. has been fighting a large battle of the price of oil.

The price of gasoline has been brought about 10 cents higher. The product of the Standard Oil Co. of gas has been brought about 10 cents higher. The product of the Standard Oil Co. of gas has been brought about 10 cents higher.

The unexpected development of the Los Angeles Valley oil fields came as a surprise to the entire country. It was suddenly realized that oil could be shipped to the mid-continent and to the eastern ports by way of the Panama Canal very cheaply. At present some 277,000 gal. of oil pass daily through the canal from California.

The present conflict of interests, however, in the oil world was brought to a crisis by an annual situation in the mid-continent field. It was discovered that gasoline could be bought in Oklahoma for 9 cents a gallon and shipped to Chicago for 24 cents more, or for a total cost of 11½ cents. The cost of delivery to the garage was about 4 cents more. In other words, gasoline could be supplied the garage for 15½ cents. The tank wagon market at Chicago was 20 cents a gallon.

The opportunity was instantly recognized, and a rush followed to take advantage of the situation. Jobbers and speculators plunged into the market and it was inevitable that prices would quickly suffer. Competitors appeared in such numbers that many were obliged to reduce their prices. In a short time this cutting was being done by hundreds of dealers. The market began to slip and was soon dangerously weak. Every one began to suffer from competition.

This situation brought into the field a new competitor in Governor McMaster

Name and Exhibit	Booth No.
Pageol Motors Company—Pageol Buses.....	304-305
Federal Motor Truck Company—Bodies and chassis.....	154-164 incl.
Garford Motor Truck Company—Motor buses.....	319-314
Graham Brothers—Motor trucks.....	138-142
Hoover Body Company—Hoover bodies on White chassis.....	303-305
International Motor Truck Corporation—Motor buses and parts.....	301
New York Transportation Co., Fifth Ave. Coaches.....	151-195 incl.
Reo Motor Car Company of New York, Inc.—Reo buses.....	124-136 incl.
The White Company—Buses and chassis.....	133-147 incl.
Yellow Coach Manufacturing Co.—Coaches and chassis.....	313-319 incl.

Name and Exhibit	Booth No.
Johnson Fare Box Company—Fare boxes.....	608
Waukesha Motor Company—Gasoline engines.....	117-119
Timken-Detroit Axle Company—Fare boxes.....	117-119
Heywood-Wakefield Company—Fare boxes.....	117-119
Hale & Kilburn Corporation—Fare boxes.....	117-119
N. A. Petty Company, Inc.—Fare boxes.....	117-119
E. B. Butler & Sons Company—Fare boxes.....	117-119
use of buses.....	166
Fountaine-Childs Corporation—Fare boxes.....	121-123
Globe Ticket Company—Ticket and fare boxes.....	572-573
Rubberset Company—Paint brush.....	127
Sherwin-Williams Company—Paint.....	574-580

of South Dakota, who is reported to have purchased twenty carloads of gasoline at the low price, with the intention of selling them at a figure under the regular market quotation at the time. At this point the Standard Oil Company of Indiana made its drastic cut of 6.6 cents on a gallon of gasoline. The reverberations from this shock have been felt throughout the country. Other governors have taken up the cudgel in behalf of the motorists, and in the course of recent events the gasoline war has been officially recognized by the United States Department of Justice, which recently announced that it will conduct an investigation to determine if there has been an illegal combination to restrain trade or fix prices. Undoubtedly the action on the part of the consumers in taking matters into their own hands, as interpreted through Governor McMaster's action has been most disconcerting to the oil industry in general.

One statistician has estimated that the public is saving 12 cents a gallon over the high price of 1920. Applying this to June consumption gives a daily saving of \$2,500,000 to consumers. As to the loss to the oil industry, it is calculated that it will figure 10 per cent, which means \$800,000,000 annually on the eight billions invested in the oil industry.

As to what will happen in the future it is hard to say. W. C. Teagle, president of the Standard Oil Company of New Jersey, discussing the situation recently said: "It has required fully a year to recover from similar flurries in the past. The present situation will right itself more quickly. In the oil business we are always climbing up one hill or sliding down another. A year from now the present difficulties will have been forgotten and doubtless we shall be worrying about wholly new problems. The peak of production will be reached in the three big California fields next month, and then a natural reaction will set in."

### Gasoline Prices—August 24, 1923

City	Cents per Gal.—	
	Tank	Service Station
Albany, N. Y.	19	21
Atlanta, Ga.	18	21
Boston, Mass.	19 5	22
Chicago, Ill.	13 4	15 4
Detroit, Mich.	14 8	16 8
Fort Worth, Tex.	8	10
Indianapolis, Ind.	14 2	18 2
Jacksonville, Fla.	16	21
Kansas City, Mo.	12 9	15 9
Louisville, Ky.	18	21
Memphis, Tenn.	14	19
Milwaukee, Wis.	14	16
Mobile, Ala.	16	20
Newark, N. J.	19 5	23
New Haven, Conn.	19 5	23
New Orleans, La.	12 5	16 5
New York, N. Y.	19 5	22
Oklahoma City, Okla.	14	17
Omaha, Neb.	14 25	16 25
Philadelphia, Pa.	19	24
Pittsburgh, Pa.	19 5	26
Richmond, Va.	13 6	15 9
St. Louis, Mo.	14 9	16 9
St. Paul, Minn.	19 5	24
Salt Lake City, Utah	14	17
San Francisco, Cal.	15	19
Seattle, Wash.	18 5	22 5
Spokane, Wash.	20	22
Washington, D. C.		

## Rolling Stock

**West Shore Transportation Company, Manitowoc, Wis.,** plans to add a White twenty-passenger bus on its line between Sturgeon Bay and Manitowoc, Wis.

**The City of New York** recently ordered nineteen thirty-passenger trackless trolley cars from the Brockway Motor Truck Company, Cortland, N. Y.

**Interurban Rapid Transit Co., Stevens Point, Wis.,** has purchased a fifteen-passenger Packard bus to be used on its bus line operating in Stevens Point and vicinity.

**Kittrell, Calloway & Webb, Lexington, Ky.,** recently added three McKay Special sedan buses to their line. This concern holds a number of franchises and operates several bus lines.

**Pierce Arrow** buses have been installed recently by the following New Jersey bus operators: A. A. Lydecker, Paterson; John T. Black, Jersey City; Joseph W. Schafack, Jersey City; Paul Casper, West New York; Henry Habick, West New York, and J. P. Trudzinski, Bayonne.

**Connecticut Company** recently installed three new Mack buses on its system in Waterbury, Conn. Four White buses are already operating in Waterbury on the Walnut Street-Highland Avenue line.

**Northern Indiana Railway** recently installed three buses on its line in South Bend, Ind. They are of twenty-five-passenger capacity with White chassis and Champion bodies.

**Eastern Wisconsin Electric Company, Sheboygan, Wis.,** has recently placed an order for two twenty-four-passenger Fageol buses for use on the route between Fond du Lac and Beaver Dam, Wis.

**National Bus Company,** operating between New Brunswick and Cranbury, N. J., recently installed a twenty-five-passenger International Harvester bus on that route. The line also serves Dayton, Deans and Monmouth Junction, N. J.

**Irvington, Reedville & Warsaw Bus Line,** operating near Washington, D. C., recently put in service three special sedan buses, each of sixteen-passenger capacity. These buses were built by the McKay Carriage Company, Grove City, Pa. This line has particularly heavy traffic the greater part of the year.

**Richmond Bus Terminal, Richmond, Ind.,** is being constructed by E. D. White, operator of the Glenn Miller Transfer Company and the Yellow Cab Company. The building will be ready for occupancy early in September and will serve as a terminal for all the bus lines entering the city.

**Blue Motor Coach Lines,** operating buses in Minnesota and Wisconsin, announce a new bus service between Toledo and Cleveland, Ohio.

**West End Transportation Company, Dodgeville, Wis.,** which operates from Madison to Dodgeville, recently announced the operation of a bus line from Dodgeville to Dubuque, Iowa. The route will include the following cities: Mineral Point, Darlington, Shullsburg and Benton. Two twenty-passenger Stoughton buses will be used for the run.

## Garages and Shops

**Boulevard Transportation Company, Minneapolis, Minn.,** has leased the Yale Garage, 25 Thirteenth Street, Minneapolis, for a period of ten years. The garage is to be one story, with a frontage of 35 ft., and will be used by the company as a repair station and terminal for its Lake Minnetonka buses.

**New Bus Garage for Newark, N. J.—**A \$65,000 garage capable of housing sixty buses is to be built in Newark, N. J., by the Springfield Avenue Bus Owners' Association, according to officials of the organization. A plot of land at the corner of Springfield Avenue and Forty-second Street has been acquired for \$11,500. The garage will include the necessary shop facilities to keep the forty-four buses of the association in repair. The offices of the organization will also be located in the garage, together with locker space and shower baths for the drivers.

**Los Angeles Railway, Los Angeles, Calif.,** is to build a new garage on company property near Sixteenth and San Pedro Streets.

The building will be of brick with a frontage of 157 ft. on Sixteenth Street. It will accommodate fifty buses. There will be a clearance of 15 1/2 ft. at doors to allow for double-deck buses. Brick construction will be used with ventilated windows in steel frames. The floor and foundation will be of concrete and the roof will be galvanized iron. There will be eighteen ventilators in the three ridges of the roof to take off heat and gas fumes quickly. Machines will drive in at the west end of the building. Three large sliding doors will be used. Although the east wall of the building will be closed for the present, it will be constructed with provision for three doors at that end if it becomes necessary to expand the facilities.

## Business Notes

**H. De Long Fry** has been appointed general sales manager of the Apollo Magneto Corporation of Kingston, N. Y., and New York City. He was formerly assistant manager of the Union Truck Manufacturing Company of New York City, head of the importing and exporting firm of H. De Long Fry & Company and branch manager of the Pilot Motor Car Company of Richmond, Ind.

**Yellow Cab Manufacturing Company, Chicago, Ill.,** recently announced that although present production of buses in its plant is only one a day at the present time, the schedule calls for fifty in September and 75 in October. Chicago Motor Coach Company will purchase the entire output until present expansion requirements are met, after which buses will be sold in other cities, it is said.

**Gordon Lee** has resigned as general sales manager of the Yellow Cab Manufacturing Company to become connected with the Fageol Motors Company of Oakland, Calif. It is understood that Mr. Lee will be general manager of a bus manufacturing plant which the Fageol company expects to establish at some point in Ohio. He resigned several months ago as chief of the automotive division of the United States Department of Commerce in order to accept the place with the Yellow Cab Manufacturing Company.

**Eisemann Magneto Corporation Brooklyn, N. Y.,** announces the opening of a branch office in the Wells-Fargo Building, 85 Second Street, San Francisco, Calif. Manufacturers and service stations in the Pacific Coast territory will be supplied with magnetos from stock carried at the branch and deliveries will thus be expedited. Shipments are made from the plant in Brooklyn via water route and a saving in transportation charges will accrue to all buyers of Eisemann equipment. O. S. Stanley has been selected to act as District manager and takes charge Aug. 1. Mr. Stanley has been in the employ of the Eisemann company since June, 1921. He was formerly associated with the American-Bosch Magneto Corporation as manager of the New York branch.

**L. W. Seeligberg,** who resigned on July 1 as business manager of BUS TRANSPORTATION and the ELECTRIC RAILWAY JOURNAL to engage in industrial advertising service of his own, has established an office at 50 Church Street, New York. He will specialize in the handling of technical and engineering accounts, particularly such accounts as place advertising in trade and technical publications. Mr. Seeligberg is a graduate of Stevens Institute. He has had more than twenty years' experience in the preparation and placing of technical advertising copy, mostly with the McGraw-Hill Company and its predecessors, and knows the markets for materials and equipment, and the possibilities for application and use of technical processes and various types of machinery. Early in his career with the McGraw-Hill Company, Mr. Seeligberg had charge of its copy service department, a post to which he was advanced because of his ability quickly to discern copy of thought-compelling interest in which the selling points were attractively developed. The ability thus manifested by him naturally led to his advancement with the company to the office of business manager, in which capacity his talents came to be more fully recognized as a force not only in the publishing company itself and among his associates in business, but particularly with advertisers offering service or equipment, or both, for sale. His experience has also covered the solicitation of advertising in the field as a member of the McGraw-Hill sales forces.



# BUS TRANSPORTATION



New York, October, 1923

## Buses Replace Electric Railway System

Ten Miles of Track Torn Up and Streets Repaved in Everett, Wash.—  
Real Estate Values Increased and Greater Building  
Activity Along Bus Route

THE city of Everett, Wash., has partly substituted buses for the local street car system and likes the new plan! This does not indicate, by any means, that the same substitution should be made in other cities, but it has shown that real estate values and building activity do not necessarily drop off when the electric railway service is discontinued and the tracks removed.

The same company operates the buses that formerly operated the street car system, so there was no question about confidence in the new management. The buses were introduced by degrees; two were first tried and when patrons had learned to like them, more were put on until seventeen are now in service. Finally the elements gave the buses an opportunity to "make a hit" with the public. Last February, soon after the new service was started, an unusually heavy snowstorm left the city stormbound. Street car service was out of the question, but the buses ran, which was a final stroke in winning the approval of the people of the city as a whole.

With popular favor aligned with the new form of transportation and when it was found that the service (with the same number of car-hours) was as good or a little better than formerly, owing to the greater flexibility of a system not confined to single track, building activity in the residential districts affected increased.

Favor for the new type of conveyance extended also to the city administration. The police department has reserved and marked "Bus Parking Zone" along the curb in congested districts, or whenever this has been necessary to insure a clear space so that the buses can come to the sidewalk to discharge or take on passengers.

Everett is a city of 30,000 population. It lies on the shore of Puget Sound some 30 miles north of Seattle. The idea of serving the entire city with a bus system began to take definite shape when the traction company was confronted with a paving program of prohibitive cost. To keep

schedule to compete with the fifteen minute service offered by jitneys. The jitneys were then put out of business. Frequent service with small units such as the Birneys was found to be the only way the traffic could be handled, jitneys or no jitneys; distances in Everett are not



The midtown transfer point is at Hewitt and Colby Avenues, which are 100 ft. wide. No parking signs on stands on the 20-ft. sidewalks keep the curb space clear for bus passengers

up and reconstruct the paving along its track, as required by law, an expenditure of \$400,000 was in prospect, of which \$100,000 would have been an immediate outlay. The company had already done everything it could to cut operating costs and increase the net, but it was still dangerously near the red on the balance sheet.

Among the economies was the Birney one-man trolley cars. These came into vogue when it was necessary to cut the original half-hourly trolley

great, and climatic conditions are unusually conducive to walking. If the headway is much greater than ten minutes a considerable percentage of prospective passengers walk or use their automobiles.

The Birney cars also paved the way for the bus by developing some of the fundamentals, under Everett conditions, as to the largest car practicable to operate with a good load factor and still keep to the one-man unit. The Birneys seat thirty-three passengers. Buses of practically the



same size (seating twenty-nine and with standing room in the same ratio) would afford much the same service as the Birneys and would have certain advantages, one of which was freedom from the unbearable paving burden. All the streets under consideration were paved—a condition that favored the bus while putting a heavy burden on the electric railway.

An important advantage of the bus not wholly appreciated until the new vehicles were in service is that trippers (extra cars) can be put on for the rush hours without affecting the schedule of the regular cars, as would be the case of a single-track railway. Again, a loop route can be

Council. According to this ordinance, each "trackless trolley or other motor propelled" vehicle is subject to a fee of \$25 a year. This amount is compensation for the right to operate on the streets and avenues. The vehicles used must be "so constructed as not to be injurious to persons, traffic, property or streets." And the franchise runs until Dec. 3, 1950, or about twenty-eight years.

When it comes to fighting snow, the bus service will doubtless cope with it better than did the railway system. Bad snow conditions are rare in Everett, so that the electric railway had never been able to afford equipment expressly for use in clearing tracks.

vehicles in the repair or paint shop. The bodies now being built by the traction company show considerable change, compared with the first bodies. Headroom has been increased, and minor details improved. Basic construction elements are now much the same as in the Birney cars; the ceiling is 3-in. spruce ribs covered with a cotton padding and a canvas top. Body ribs are made of steel T-iron (one piece). In the small size required these weigh no more than wood ribs. The body sheathing is likewise made of steel instead of aluminum. It was feared at first that rumbling might develop with this sheathing, but nothing of the sort has happened.

The aisle covering in the first bodies was edged leather. Now a fabric made locally from old tire casings is used. It wears better, is lighter, will not slip and costs 50 cents per square foot, or about one-third the cost of the other type.

#### PNEUMATIC TIRES FAVORED

When the first buses were ordered it was believed that only about 10,000-mile life could be expected from pneumatic tires. They were equipped therefore with cushion tires. After some service these became rough, giving an effect like a many-sided flat wheel on a street car and causing excessive vibration. Even with careful turning the condition could not be kept up to standard.

By this time the company had some remarkable records with pneumatic tires on interurban stage runs. On the strength of this, all city buses were equipped with pneumatic tires. That these will be satisfactory is believed to be assured by the increasingly good mileage shown on the stages operating out of Everett. Tires there are averaging 30,000 miles, with instances of 60,000-mile service. The treads do not wear out, failure practically always coming from blow-outs in the side walls.

City buses use dual tires on the rear, of sizes from 34 x 5 for the light buses to 36 x 6 for the larger equipment. Standard pressure for all tires is 95 lb. per square inch.

#### EXTENSION VALVE STEM FOR DUAL TIRES

On the buses in city service the valve on the inner tire is made accessible by an extension stem brought through an opening in the outer disk wheel. A 3-in. elbow is screwed onto the standard valve. Into this elbow is screwed a 3-in nipple, and this in



*Colby line bus discharging passengers at curb at Hewitt and Colby Avenues*

traversed in opposite directions, thus improving the service without the delays often found at scheduled meeting points, as would be required on a single-track railway. These and other factors made possible a better service with buses under Everett conditions with the same number of man-hours and car-hours that were used on the railway system.

Service was started on Dec. 1 last, under an agreement with the City Council that the company would operate for a reasonable experimental period on a 5-cent fare, and that the whole question would then come up for review and readjustment. The full complement of fourteen buses was not in use until June 20. Meantime the removal of abandoned track had been under way and by Aug. 25 the last of the 10 miles of track was removed and the paving restored.

The company's operation of buses is authorized by an ordinance passed on Aug. 15, 1922, by the Everett City

The snow-fighting equipment used for the bus lines, on the other hand, consisted of a tractor pulling an ordinary road scraper. This, with chains for the bus tires and a sand wagon, proved satisfactory during the heavy snow of last February. Dual tires were found not to slip badly on ice. The sanding was done principally on icy streets at approaches to intersections where buses were slowed up or stopped. Keeping streets open in this way made a good impression, particularly on the owners of private automobiles.

The equipment used in the city service consists of the following: Eleven twenty-nine-passenger Fageols, bodies factory built; four twenty-five passenger Model 50 White chassis, with Everett-built bodies; two nineteen-passenger Model 15-30 White chassis, with Everett-built bodies. Of these about fourteen are required to maintain the schedule and three held in reserve, to replace



turn connects with a second valve stem by means of a standard coupling. The valve proper is removed from the stem that actually fits into the tire and is used instead in the second valve stem on the outer end of the extension, thus making the control easily accessible. When the assembly is made the joints are "shellacked" on, instead of being soldered. Of course the extension stem has to be taken off when a tire is removed, but in this service changes are usually made in the shop. Where a shoe has to be changed on the road the standard valve stem can be used until the bus is again in the shop.

On all the Fageol city buses Westinghouse air brakes were supplied. Until recently factory experts have been on the job adapting the equipment to the service, and many important changes have been made. Improvement has been constantly toward heavier parts and about 100 lb. has been added to the original weight of each brake installation. Steel shoes have replaced the aluminum shoes. The inside of the reservoirs has been enameled on account of the corrosive action of certain gases.

The steel brake bands now used are estimated to give a service of 40,000 to 50,000 miles, thus requiring renewal, say, once a year, while the fabric bands of the ordinary bus would require renewal, say, once a month. The steel shoes are estimated to give 20,000 to 25,000 miles of service, or renewal twice a year.

Of the local electric railway system there still remains one 5-mile line. This extends from an industrial center north of Everett through the city to another industrial center to the south. Service is maintained by nine Birney cars, of which six are used for normal service. This line has been kept on rails because:

1. The track has been constructed recently, and it was not desired to write off this large investment.
2. The track has 80-lb. rail and is in good condition.
3. Owing to the rush-hour travel to and from the industrial plants, traffic conditions are not well adapted to bus service. At the outset there would have been a considerable investment for equipment needed to serve the peaks, but which would lie idle the rest of the day.
4. The route traversed by this line is not paved at either end.

Transportation service is conducted by the Puget Sound International Railway & Power Company, of which George Newell is manager and H. W. Grant is superintendent.

## Declining Patronage Leads to Bus Operation

Bus and Trolley Run Alternately by Connecticut Interurban System — Express Service Tried, but Local Riders Object

FROM New London, Conn., five modern buses are now operated by the Groton & Stonington Traction Company. This company, with its associate and former holding company, the Shore Line Electric Railway, has had the experience of many interurban electric properties. In recent years improved highways have been built paralleling the electric lines, and the patronage has been

over the Thames River, and is opened so frequently as to cause serious interruptions to service. At least it did in the old days when the trolleys tried to keep to a fifteen-minute headway. Many trips would be lost altogether, and the electricies seemed to spend most of their time waiting on the drawbridge.

The combined bus and trolley system is now run on a thirty-minute



*One of the Fageol buses used in intercity service by the Groton & Stonington Traction Company*

limited, even showing a gradual falling off.

To offset the competition of the private automobile one White Model 50 and four Fageols, all fitted with street-car type bodies, have been put in service out of New London. Two of these run 12 miles eastward to Mystic, while the others run along the shore to the west, on 6-mile routes to Golden Spur and Eastern Point. The fifth bus is held as a spare. Most of these vehicles have been in service only since June 1. During this period the change-off has averaged less than one in 5,000 miles of operation, on a schedule calling for 250, 200, 180 and 150 miles a day for the four buses in regular service.

On the Mystic line particularly the high overhead costs of the trolley were felt. These were really "standing" charges as the English call them, because of a drawbridge just outside New London. This passes

headway, with much better over-all economy. But some experimenting was conducted before the present schedule was adopted.

### EXPERIMENTING WITH SCHEDULES

At first the Groton & Stonington Company planned a de luxe bus service, New London to Mystic. Trolleys would leave on the hour, and buses on the half hour. Fares were to be 35 cents on the trolley and 50 cents on the bus, but the latter was to run express through to the end of the route in Mystic. On this basis the bus running time was thirty-five minutes, as against fifty-five on the trolleys.

Starting on May 23 two of the Fageol buses were run "express," but after six weeks the through business proved insufficient to warrant such a service.

Local riders, to the towns of Groton, Poquonoc and Noank, ob-

jected to the new arrangement. They were deprived of their half-hour service. The through riders also were dissatisfied. They were given half-hour service, but with a string to it. What was the saving in time of twenty minutes, as compared with the 15 cents extra fare exacted on the bus? People even argued: If we let the company get away with this, some day the trolleys will be gone and we will have only the buses, at an increased fare.

One fine morning in June all these objections came to a head. On that morning a bundle was found on the company's front door steps. In it was a petition, duly signed and countersigned. Let the half-hour trolley service be restored, was the important thing in the petition. And it came from the selectmen ruling

rooms, and clock dials that are set to show the leaving time of the next bus on each route. Lunches are served, and candies, sodas and cigars are sold. Each bus operator pays a small monthly rental for the use of the station and for telephone privileges.

#### ZONE FARE COLLECTION

Considering that amounts from 5 up to 35 cents must be collected, what seems to be a simple method of collecting fares has been developed. Johnson fare boxes that take up to and including 25-cent pieces are used. On the Mystic line advantage is taken of the fact that most of the passengers are bound either for Groton, a 5-cent fare point, or to the end of the line, for which 35 cents is charged. Between there are a number of 5-cent zones. This situation

of a regular run. The pay is practically the same as on the trolleys, where the men get 50 to 55 cents an hour, and 5 cents more for one-man car operation.

Seven operators are employed on the buses. Five of these are former platform men, motormen or conductors; the other two were truck drivers, who were accustomed to make all minor repairs on their vehicles and to work long hours without overtime. These men have proved particularly satisfactory, the bus work seeming very attractive to them.

The former trolley men are inclined to feel that the bus work is harder. Most of them applied for it in order to get better working conditions. They either had a night run on the trolley or no run at all. After picking a bus run they are not permitted to choose a trolley run again, unless there is some good reason for the change. They are then allowed to take their trolley seniority, but lose their seniority on the buses.

Neat chauffeur uniforms, including puttees, are worn by the operators. The company advances the money for the uniforms, and a small amount is deducted from the pay envelope each week until it is paid.

On the first bus, a White 50, the operator took care of it himself, and was responsible for lubrication, minor adjustments, and for keeping the vehicle clean. When the fleet was enlarged the old power house was converted into a garage, and the mechanical department took over the maintenance.

The cost of operation, in cents per mile, to date is:

	Cents
Maintenance .....	3.0
Tires .....	4.0
Operators .....	5.0
Insurance .....	2.5
Gasoline and oil .....	3.5
Overhead .....	2.5
Depreciation .....	6.0
Total .....	26.5

In view of its short experience the company has come to no final conclusion as to the proper place of the motor bus. One of its officers indicated to an editor of BUS TRANSPORTATION that the riding public seemed well pleased with the bus, and would be satisfied with a complete change-over to this form of transportation. There is a strong probability, he felt, that in the near future the bus will supplant the trolley, at least on interurban lines paralleling the improved highways and on which the traffic is limited or even decreasing.



*In front of the New London Union Bus Terminal. Vehicles are shown in the space assigned by the city*

the various towns along the Mystic route!

Half-hour service was restored. Not half-hour trolley service, however. The two forms of transportation are run alternately. In the morning the first trolley leaves New London at 6.05, then the first bus at 6.45, another trolley at 7.15, another bus at 7.45, and so on trolley and bus alternately through the day. The running times and fares are the same on bus and trolley.

#### BUS TERMINAL OPPOSITE RAILROAD STATION

Unusually good terminal facilities are available in New London. The city has provided a space directly opposite the New York, New Haven & Hartford Railroad station, where the buses can park, as well as load and unload. This is used by all the buses entering the city.

The owner of a store facing the bus stand has turned it into a union bus station. This contains settees for about forty people, comfort

has led to the following method of fare collection: At New London all passengers deposit a nickel in the farebox, and the balance on leaving the bus if they go beyond the first zone. Going the other way passengers pay the full fare, less a nickel, if they are going to the last or New London zone. Then when leaving the bus in New London all deposit a nickel. As the intermediate-zone business is small, the operator can keep a fairly good check on his passengers without the aid of a complicated ticket or receipt system.

The fare collection is simplified on the two other lines, to Golden Spur and Eastern Point. These have a 20-cent fare, and two 10-cent zones. The pay-enter and pay-leave plan is followed; that is, all passengers deposit a dime as they enter, and if they travel through two zones a dime when they get off.

Operators are paid \$5 a day, for an average run of ten hours fifteen minutes. Overtime is counted as time and a half, unless it occurs before the end

# Bus Operation Well Started in Louisville

Local Traction Company, Through Subsidiary, Runs Two Bus Lines—Fares Are Higher than on Street Cars—Drivers Selected from Motormen and Conductors—Shop Building of Railway Company Transformed into Garage

**B**EHIND bus operation in Louisville is the belief that this kind of transportation is destined to become an essential auxiliary to city electric rail transportation. Actuated by this belief, and preferring to have the buses under its own direction rather than as competitors, officials of the Louisville Railway organized the Kentucky Carriers, Inc., a few months ago. The latter, therefore, is a subsidiary formed to maintain and operate buses. It is capitalized at \$200,000, with all of its capital stock held by the Louisville Railway. The president of the street railway company, J. P. Barnes, is also president of the bus company.

Kentucky Carriers, Inc., is now operating two bus lines on regular schedules. Both of these have their downtown terminal at Third and Market Streets, in the center of Louisville. Bus service has already proved very popular, and it is hoped

the business will soon be on a paying basis.

On the first route, which was started on June 24, six buses were put in service. From Market Street this leads south on Third to Shipp Street, a distance of 2.65 miles. The headway at first was ten minutes, but the route was soon extended to Beechmont, a suburb of Louisville, 5.35 miles from the downtown terminal. The headway was then increased to twelve, fifteen and twenty minutes, more frequent service being given during the hours of the day when it is required.

The Third Street route is free of car tracks, but on Second and Fourth Streets there are street railway lines. The bus fare is 10 cents, however, as

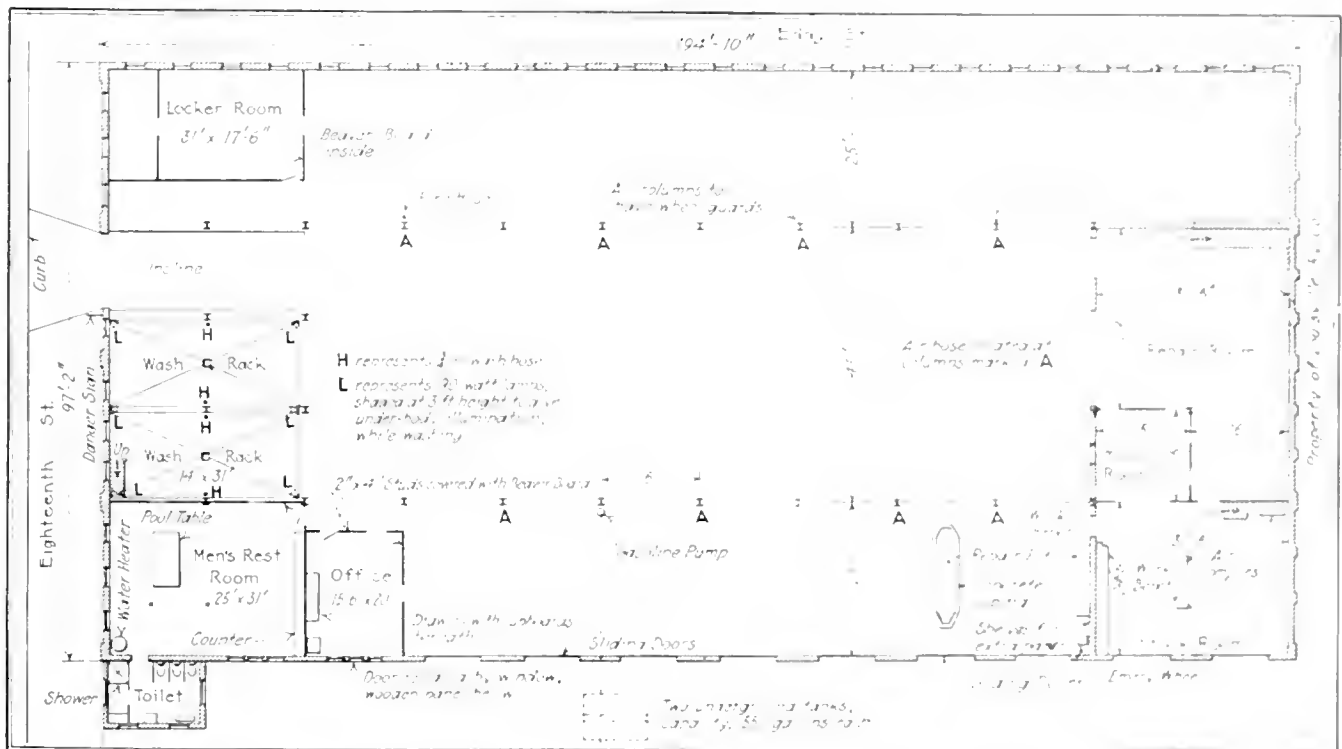
compared with 7 cent fare on the electric system.

On the second route, where six more buses were installed on July 22, the buses follow Third Street down to Breckenridge, and then run east to Cherokee Road, afterward skirting Cherokee Park. The length of this route is 5 miles, and its eastern terminus is some five blocks away from an electric car line.

With experience in bus operation acquired, it has been found necessary to change routes and schedules somewhat. There has been a demand, also, for special service. For example, extra buses have been run to Parkway Field, which is Louisville's chief baseball park, four blocks from Third and Shipp Streets.

As has been mentioned before, twelve buses are now serving the two routes, and twelve others have been ordered. Those in operation are of the single-deck type, Model 50 White chassis, with Bender body. The

*Plan view of Kentucky Carriers' garage. Here are accommodations for the twelve single-deckers and twelve double-deckers which will form the installation*





Twelve of these 25-passenger buses are now serving in Louisville

ones yet to be delivered will be double-deckers, and are being built by the Yellow Coach Manufacturing Company, Chicago.

The single-deck buses seat twenty-five passengers. Budd Michelin wheels are used with 36 x 6-in. Good-year tires, single in front and dual rear. The electrical equipment includes an extra size 300-watt generator and an Exide 120 amp.-hr.

battery. These were required because the buses contain a large number of dome lamps for interior illumination, and, in addition, two headlights, two marker lights, both

#### Operating and maintenance forms used in Louisville

At top, monthly and daily records for gasoline and oil. Second row, individual tire record and tire "off and on" form. Bottom, repair instruction form and card showing work performed and materials used.

front and rear, one tail-light, one rear stop light and one fare box light. Johnson Type "D" fare boxes are used, the 10-cent fare being collected as the passengers enter.

Outside the buses are painted royal blue with yellow wheels and a yellow horizontal stripe running around them, on which the lettering is in royal blue. Inside the finish is dark mahogany with white ceilings. The upholstery is of real leather.

Plenty of space for the rolling stock is found in a building used for shop purposes by the Louisville Railway. This had just recently been rented for a garage, but to make sure that the facilities were suitable, there were added accommodations for the bus drivers, a repair pit, an air compressor, facilities for washing the vehicles, and equipment for storage of gasoline and tools. All this is on one floor, as shown in the accompanying plan. The repair room and tool storage are placed at the rear, with lockers and rest room for the men, office accommodations and wash racks at the front of the building. At the corners of each of the two wash racks are placed 90-watt lamps 3 ft. above the floor and shaded so as to give underbody illumination during the washing.

FORM 603

### MONTHLY GASOLINE AND OIL RECORD

MONTH OF 192

DATE	CAR NO. 1				CAR NO. 2				CAR NO. 3				CAR NO. 4				
	GAL.	GAL.	LBS.	MILEAGE	GAL.	GAL.	LBS.	MILEAGE	GAL.	GAL.	LBS.	MILEAGE	GAL.	GAL.	LBS.	MILEAGE	
1																	
2																	
3																	
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27																	
28																	
29																	
30																	
31																	
TOTAL																	

FORM 602

### DAILY GASOLINE AND OIL RECORD

24 HOURS ENDING 2:00 A.M. 192

CAR NO.	GASOLINE		OIL		GREASE		MILEAGE		
	PREVIOUS	PRESENT	PREVIOUS	PRESENT	PREVIOUS	PRESENT	PREVIOUS	PRESENT	
1									
2									
3									
4									

FORM 601

### CAR NO. 192

TIME OFF A.M. P.M. DATE 192

TIRE OFF NO. TIRE ON NO.

Meter Readings: DRIVER FOREMAN

REMARKS

FORM 604

### AUTOMOBILE REPAIR ORDER

192

Please make following repairs to Auto License No.

No. Dept. Foreman

Charge to

FORM 605

### DAILY TIME CARD

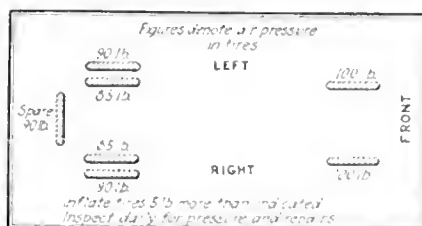
DESCRIPTION OF WORK

Date 19

RATE HOURS

The bus drivers, who are neatly uniformed, as shown in the photograph, are recruited from the motormen and conductors of the Louisville Railway. Notices were posted offering the bus positions to the men who had had good operating records and also who had had previous experience driving automobiles. So popular was the offer that applications were received from three times as many men as were required. Bus drivers were offered 5 cents an hour more than the amount received by city motormen and conductors on two-men cars.

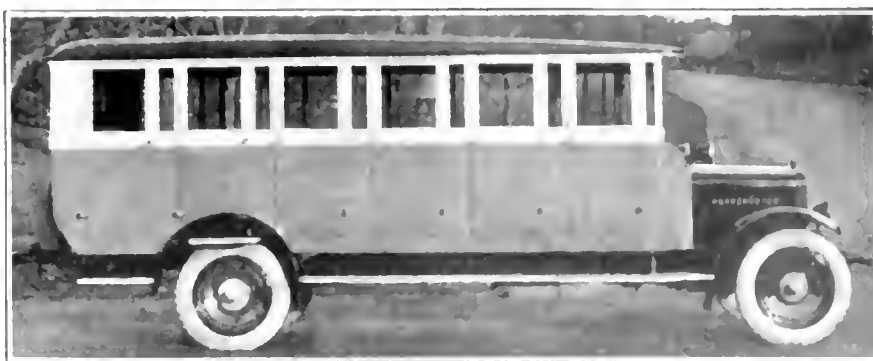
Samples of the forms used in keeping tabs on the cost of operation and maintenance are shown here. It will be noticed that careful record is kept of tire life and of gasoline and oil



Instruction sheet for inflating tires

consumption, and also of the time used in repair work for the various vehicles.

From these records are derived many of the figures needed to carry on the main accounting system. This is based on the uniform system of accounts prescribed for electric railways by the Interstate Commerce Commission. Its main headings are "Operating Revenue Accounts" and "Operating Expense Accounts," the latter having the four divisions: 1. Ways and Structures. 2. Maintenance of Equipment. 3. Conducting Transportation. 4. General and Miscellaneous. The third item, Conducting Transportation, is divided into Vehicle Operation and Garage Operation.



The limousine type G.M.C. bus operated between Grandview and Belton

## Missouri Intercity Lines Maintain Quality Service

State Program for Better Roads  
Encourages Suburban Lines,  
Which Are Increasing in Number

KANSAS CITY has taken to the intercity motor bus with enthusiasm. The growth of the suburban bus business into this Missouri city has been phenomenal in the past few months. The country in general, as well as the climatic conditions there, is favorable to speedy, comfortable and reliable all-year service. Intercity lines are increasing in number and will increase more rapidly when the suburban highways are put in better condition. The State of Missouri recently appropriated \$60,000,000 for road maintenance, a large part of which is to be used in Kansas City and vicinity. With the improved condition of the roads, it is said that very soon buses will be radiating from the city in all directions, so that any subur-

ban point can be reached by a bus leaving a Kansas City terminal on a definite schedule. Indeed, a Union Station has already been established by the leading bus operators in the central part of the city. This terminal is equipped with all modern conveniences.

From this terminal operate several intercity lines. One of these is operated by R. C. Zumwalt, a pioneer bus owner in Kansas City. Six years ago Mr. Zumwalt established a line from Kansas City to Grandview and Belton, a distance of 22 miles. In the early days he used a seven-passenger automobile and made two trips daily. Today, a twenty-seven-passenger limousine type bus on a G. M. C. chassis with a 190-in. wheel base runs over this line, in addition to a seven-passenger touring car. The popularity of the line is shown by a steady increase in traffic from month to month.

Another successful interurban line is operated by Glenn Butler, under the name of the Suburban Stage Lines. Mr. Butler maintains his own waiting room at 204 East 13th Street. He started operation in 1922 with a line to Lee's Summit and intermediate points. He uses a White Model 50 bus, with a seating capacity of twenty-five, and a 202 in. wheel-



Types of buses used by the Suburban Stage Lines. In the background is the commodious Kansas City waiting room





One of the five Fageol limousine type buses operated by the Inter State Stage Line

base, fifteen-passenger Packard Twin Six. Both have baggage accommodations in the rear. Two spare tires are carried, one on each side of the hood. In the closed center space appears the name of the line with a list of towns served. Three more buses were recently added, and a line opened up to Lawrence, Topeka and Leavenworth, Kan., in direct competition most of the distance with an interurban electric railway.

Mr. Butler has adopted a unique ticket system. The ticket is made in duplicate, with a perforated line through the center for folding, thus bringing the figures, dates and destination on corresponding lines. When a passenger buys a ticket, the driver punches the date, fare and destination. When the passenger alights, the driver takes up the ticket, and upon arriving at the home station he turns in both stub and ticket, and in this way a perfect check is made on each trip. Another feature of this ticket is the advertising carried on the reverse side. The sale of this space goes a long way toward paying the cost of printing.

In June another bus line was started from Kansas City to Odessa, 40 miles away, by James Marr. This



Interior of baggage compartment on Fageol bus, shock absorbers sticking through floor

line uses two ten-passenger buses and makes three trips daily. The fare is \$1.25. The steam railroad charges \$1.44 for the same trip. The growth of traffic over this line has increased to such an extent that another bus is soon to be added.

The latest intercity bus line oper-

ating out of Kansas City runs every two hours to Topeka, 70 miles away. This is the Inter State Stage Line, owned by John Shosie and Joseph Petreske. This line uses five twenty-four-passenger Fageol limousine type buses, each with a baggage room in the rear. Just in front of the baggage space is a smoking compartment accommodating eight passengers, separated from the main compartment by a glass partition. The seats are upholstered with leather, while the main compartment is finished in velour. The cars are supplied with an exhaust heating system. They also are supplied with the buzzer signal system, with which all Fageol buses of this type are equipped. It consists of a heavy doorbell buzzer mounted in a box on the ceiling, together with a plunger switch, the shaft of which projects through the rear of the box. A heavy silk cord is attached to the shaft, and passes through the eyelet in the ceiling to the rear, bringing it within reach of every passenger. This arrangement reduces the amount of electric wiring to the minimum, has almost nothing that can get out of order, and keeps all parts accessible. A garage is maintained by the company, and each car is washed and inspected by an expert mechanic after every trip. In view of the service offered, the success of the Inter State Stage Line is not surprising.

Kansas City is justly proud of the type of bus service in vogue there, and with the construction of new and better roads, it is anticipated that the number of intercity lines will still further increase. Based on a policy of public service, they cannot help but be successful.

SUBURBAN STAGE LINES.		DATE		FARE		COLLECTED	
Conductor		DATE		FARE		COLLECTED	
Kansas City, Mo.	10	10	10	10	10	10	10
Leeds, Mo.	9	9	9	9	9	9	9
Raytown, Mo.	8	8	8	8	8	8	8
Knobtown, Mo.	7	7	7	7	7	7	7
Unity Farm.	6	6	6	6	6	6	6
Lees Summit, Mo.	5	5	5	5	5	5	5
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# Storage-Battery Bus in Danbury Fleet

Four Gasoline Buses Are Also Co-ordinated with Trolleys in Connecticut City and Neighboring Borough

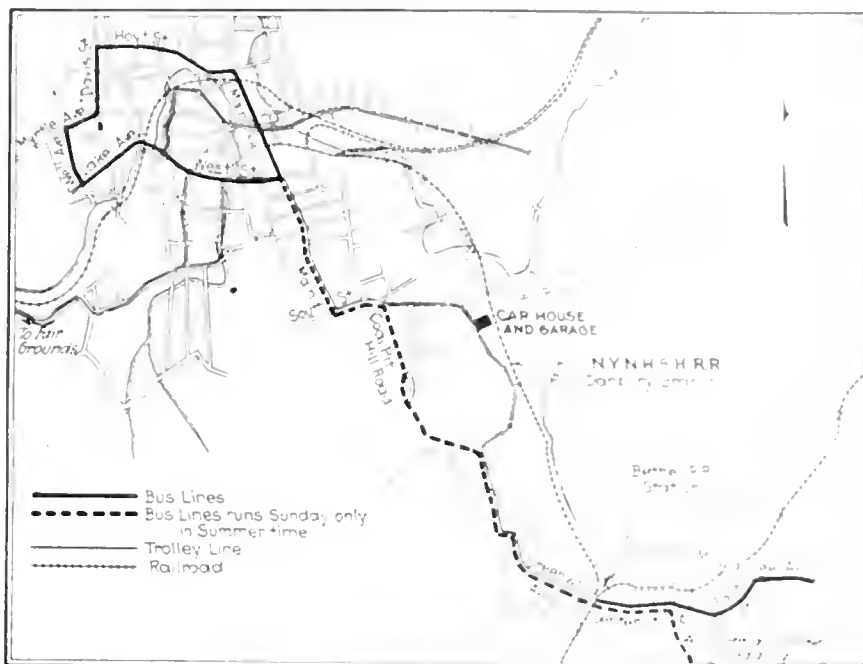
**I**N the fall of 1921 the Danbury & Bethel (Conn.) Street Railway Company seemed to be up against it. New tracks were sadly needed on certain parts of its system, which serves the hat-manufacturing center of the world with nearly 25,000 people, and also the adjoining borough of Bethel, a sort of bedroom for some 4,000 of Danbury's overflow. New tracks were needed, also track improvements, also generous paving assessments would have to be financed. And the worst of it was that the lines affected were a losing proposition even with the old tracks.

So J. Moss Ives, the receiver of the traction company, decided in favor of the bus. Four gasoline vehicles were installed, and the track was either torn up or paved over. About a year ago a storage-battery bus was bought from a local manufacturer, and this is now used for the afternoon peaks. Its construction and performance are described later in this article.

The Danbury buses take the place of two former short trolley lines that served the western part of the city. Instead of two short stub-end lines, however, the bus route completes the circle as shown on the map, and during rush hours buses are run in each direction around this belt line.

The second line, which has no connection whatever with the above mentioned belt line, is an extension of the trolley car line that still runs between Danbury and Bethel and serves the hill territory beyond the railroad crossing in the last-named place. Previous to the installation of the motor bus service the railway company operated a shuttle car over the greater part of this route, as it never had the right of a physical track crossing over the rails of the New York, New Haven & Hartford Railroad where they cross the main street at Bethel.

On the belt line in Danbury that serves the Second Ward, so called, the buses are operated on a ten-minute



Map of bus lines and trolley lines operated in Danbury and Bethel

headway from 6 a.m. to 9.30 a.m. and from 3.10 p.m. to 7.50 p.m. Otherwise the schedule calls for a twenty-minute headway. The last bus leaves City Hall, in the center of the city at 11.10 p.m. The length of this belt line is 2.9 miles. One gasoline bus was used on this line until late in September, when the storage-battery bus was put in service during the afternoon peak only. Previously the electric vehicle had served as a spare and for charter or lively work.

The schedule for the route in

Bethel calls for ten-minute service during the rush hours, from 6 to 9 a.m. and from 3 to 7 p.m. For the balance of the day and evening twenty-minute headway is effective. One bus is all that is needed to fill this schedule, which connects with the cars for Danbury. During the ten-minute service, though, due to the heavy grades on the route, which are approximately 4 per cent, the bus has all it can do to make the schedule.

The fares on the bus lines are the same as on the trolleys, namely, 10 cents cash or 25 tickets for \$2.00.



The garage has been built alongside the carhouse

The tickets, however, are sold only at the company's office and a few stores in Danbury and Bethel. As a result the largest proportion of revenue fares are paid in cash. Free transfers are interchanged between the cars and buses.

The Danbury Belt Line earns an average of about \$30 per day and handles from 400 to 500 passengers, 40 per cent of which are transfer passengers, while on the Bethel extension the traffic will not exceed 300,

cases cinders have been laid to dry up the mud and fill the ruts.

All bus repairs are made in the company's railway shops at the car-house, where a shed has been built along one side for a garage, as shown in the accompanying illustration.

#### BATTERY FORMS MOTIVE POWER

The chassis for the storage-battery bus was made by the Lansden Company, Inc., of Danbury. It is of the chain-drive type with battery

the rear wheels. The battery is removable, so that one man with a lift-truck can change it in less than five minutes.

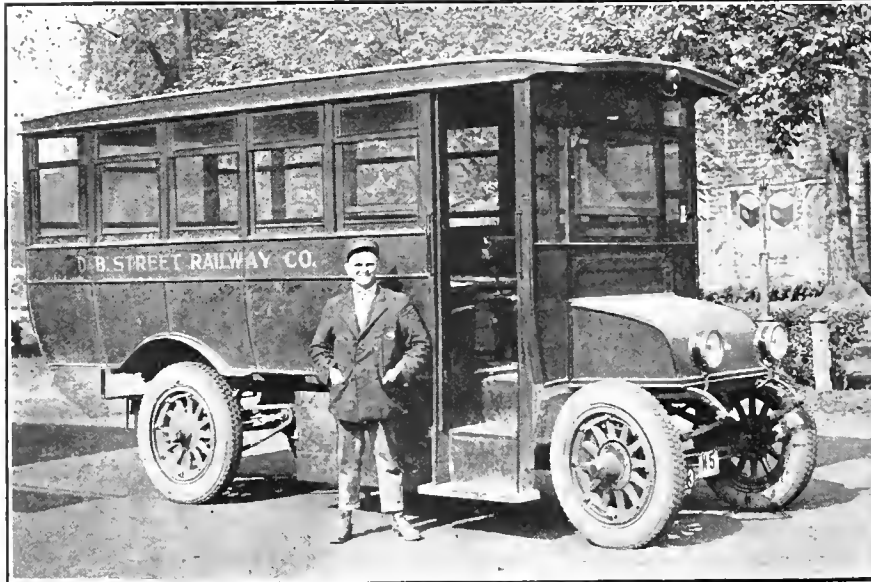
Speed control is by a handle under the steering wheel. The controller actuated by this handle is of the continuous torque type, giving practically smooth starting with no jolts or jars. Controller connections give four speeds forward and two reverse. The driver has two foot brakes, one on the rear wheels and the other on the drive shaft. Connected up with the electrical system is an ampere-hour meter, which shows the driver the condition of the battery and thus the mileage to be expected before charging is required.

Tests indicate that the bus can make 12 m.p.h. schedule speed, and can travel about 40 miles on one charge of the battery. On a trip over the belt line made by one of the editors of BUS TRANSPORTATION there were used 14 amp.-hr., according to the meter on the bus. The 2.9-mile route was covered in fifteen minutes, no stops being made for passengers or traffic. This represents a speed of practically 12 m.p.h., and an energy consumption of 4.8 amp.-hr. per mile, and is considered good performance in view of the fact that the route is largely up-hill and almost half of it is dirt road. The schedule allows twenty minutes for the trip, and five of them are being made between 4.30 and 6.30 p.m., when all Danbury wants to get home at about the same time. This of course is well within the battery capacity.

#### COST OF OPERATION

The accompanying table gives the bus-mile costs for the first five months of the current year. Wages of operators are based on a rate of 55 cents an hour for an average nine-hour day. Revenue includes returns from a line run Sunday afternoons during the summer. On good days the earnings on this line average about \$40. It gives hourly service from the City Hall in Danbury to Putnam Park, Redding, a distance of about 6 miles. The fare is 50 cents for the round trip with transfer privileges.

Charter or livery business is also handled at a rate of about 50 cents a mile. The buses seem to be favorites for trips to resorts or baseball games within a radius of 25 miles.



*This electric vehicle has a speed of 12 m.p.h. and goes 40 miles on a battery charge*

divided almost equally between cash and transfer passengers.

In addition to the storage-battery vehicle, the company owns four buses, three Grahams and one Reo. All vehicles have Paterson wooden bodies. Longitudinal seats are used exclusively in four buses, one of which seats thirteen and the others fourteen passengers. One Graham bus has transverse seats, covered with rattan, and seats sixteen passengers. This bus is used almost entirely on the Danbury Belt Line during the hours of twenty-minute service. All buses use pneumatic tires. The Reo has 34x4½ all round while the Grahams have 36x6 on the rear and 35x5 on the front. The average life of tires is 9,000 miles, while the highest mileage so far secured is 13,000. This is considered good performance considering the fact that the roads are not hard surfaced throughout. Especially is this true on the back part of the Danbury Belt Line, where the roads are all unimproved. In some

carried in a cradle under the body. The wheelbase of the Lansden 1-ton chassis was lengthened from 103 to 132 in. Front and rear axles are of Lansden design and manufacture. Tires are pneumatic, 34x5 front and 36x6 rear.

A forty-four cell Philadelphia battery furnishes power to drive a General Electric 60-volt electric motor. This is geared to a counter-shaft, which in turn drives by chains

#### Danbury Bus Operations—Jan. 1, 1923 to June 1, 1923

	Per Bus-Mile (Cents)
Transportation revenue.....	26.5
Maintenance .....	3.83
Tires .....	1.5
Depreciation .....	3.0
Wages of operators .....	7.68
Other conducting transportation expenses .....	4.83
General expenses, including injuries, damages, insurance, .....	3.25
	24.09
Net operating revenue.....	2.41
Taxes .....	0.92
Net operating income.....	1.49
Bus-miles operated .....	35,124

# Newburgh Likes the Bus

Service Is More Reliable, Better Patronized and Costs Less to Operate than Modern Trolley Equipment

ON MARCH 31, 1923, Newburgh, N. Y., a city of 33,000, saw the taking off of its last local trolley cars. It is true that track and wire still are in use over Broadway, the main thoroughfare, but these are for the accommodation of a route to Orange Lake—a four-zone line 6 miles long traversing a section which is not yet up to date in paving.

The case of Newburgh is of special interest because it is just one of those places which are supposed to be exceptionally hard for the motor bus. Located in and on the Highlands of the Hudson River, the city has some steep grades, particularly near the river front. Winters are often severe, with plenty of snow and ice to make operation on grades interesting. Yet, ironically enough, the reason that buses completely replaced trolleys was that they made a much better job of things in a heavy winter than the cars had done in the milder winter preceding.

The first bus operation began in the fall of 1922 on a crosstown line of the Orange County Traction Company. On Oct. 30, 1922, representatives of the Newburgh Public Service Corporation—the allied motor bus company—appeared before the City Council for the right to franchises on all existing electric routes. The intentions of the company were riveted for good by its following experience in the winter of 1922-1923. In the preceding winter, the failure of trolleys to operate in bad weather had produced only 47,000 passengers for December, 1921. In December, 1922, with much more snow, buses carried 106,000 passengers. On the whole winter's comparison, the buses, route for route, carried 33 per cent more people than the trolleys. As they did the work also for 37 per cent less cost per vehicle-mile, the decision of the owners of the property can be clearly understood.

Furthermore, operation during the summer months, when reliability of both kinds of equipment is on a par, indicates that the traffic-pulling ability of the motor bus is about 10 per cent greater than the trolley. The chief reasons for this are the easier accessibility of a curb-loading vehicle and the novelty of buses which are trim and attractive vehicles. There

is nothing to choose in speed, for while running speeds go to 20 m.p.h., the actual schedules remain around 8 to 9 m.p.h.

These one-man buses replaced both one-man and two-man trolley cars. The base service, however, had been given exclusively with single truck safety cars of the Birney type, seating thirty-two passengers but capable of carrying sixty passengers comfortably. On the other hand, the Fifth Avenue Type "J" single-deck buses, the standard in Newburgh, seat only twenty-five and their maker does not recommend more than a total of thirty-five passengers. With forty passengers such a bus is rather crowded. This lesser capacity is the one point of bus inferiority. However, under Newburgh load conditions excess vehicular capacity is not so vital as in larger communities with sharp peaks due to big factories and the like.

After all, the two tests of the change are these: Are there more customers under like conditions? Are the customers being served at lower operating cost? The answer to both questions is an emphatic "Yes."

As for increased riding, B. Bryant Odell, assistant to the president of the associated motor bus and trolley companies, gives the following before and after city statistics:

	Passengers Carried	Vehicles Miles Run
With trolleys, January-July, 1922	1,272,178	334,561
With motor buses, January-July, 1923	1,550,241	397,710
Approximate per cent increase	22	19

\* 370,920 Orange Lake passengers carried through city via 67,254 car-miles.

It should be explained that the motor-bus routes not only blanket the original trolley routes, but also include a new route (Downing Park) to a housing development.

As previously stated, there has been no change in schedule speed. The headways have also remained the same, viz., eight to ten minutes on Broadway, and twelve to twenty minutes on the other routes. The fare also remains at 7 cents straight.

## MOTOR-BUS EQUIPMENT AND COSTS

The Newburgh city service is handled with fourteen Type "J" buses which were bought at prices

ranging from \$6,600 to \$7,400 each. They manage to average 5.81 m.p.g. despite the severe grade, and to run 176 miles per gallon of lubricant. With gasoline at 21 cents per gallon, the combined cost of propulsion and lubrication was 1.1 cents. The pneumatic tires have given such excellent service that an average of 17,000 miles is being secured at 2 cents per mile, although the life varies between 9,000 and 21,000 miles. Wages for drivers are 50 cents per hour and add another 6 cents or so to the costs. Depreciation is written off at the rate of 25 per cent per annum. The company, however, expects a useful life of eight years, which, by the way, is the figure allowed by the British government in bus depreciation accounting.

After allowance for all other operating costs, administration, taxes, injuries and damages, insurance, interest on investment, etc., the total cost per vehicle-mile is found to be 21 cents in the period presented against an average intake of 25 cents per mile. In contrast to this, the company states that the over-all cost of its trolleys of all types new and old was practically 34 cents per mile. The buses are maintained in the rebuilt half of an old earhouse, which portion can care for thirty-five vehicles.

## HOW THE CHANGE WAS FINANCED

An important reason for the success of this conversion from trolley to bus lies in the nature of the ownership of the property. The trolley system had long been in the hands of Benjamin B. Odell, Jr., former Governor of the state of New York and for many years a prominent citizen of Newburgh. In consolidating the three original trolley lines there had been a reduction rather than an increase of overhead debt. During the past decade a portion of this overhead had been amortized. Rolling stock had also been purchased on the equipment trust plan and had been largely written off.

When motor-bus operation became the fixed mode of transportation the Birney cars, which had been in use for about three years, were disposed of at 60 per cent of cost. The net result was that the company had left outstanding a bonded indebtedness of only \$17,000 per mile of track; whereas its annual fixed charges previously with 20 miles of track, forty-two passenger and thirteen service cars had been \$40,000. Nevertheless,

the railway was unable to do enough business and at a sufficiently low cost to meet this overhead in addition to operating expenses.

On the other hand, while the motor-bus operation has added about \$22,800 a year to the fixed charges, making a grand total of nearly \$63,000, its business-building superiority and lower costs make possible an arrangement that will bring a fair return on the new capital and

yet involve only a moderate scaling down of the return on the original railway investment. From present appearances, the net for the year will be about \$60,000. Hence if the railway bondholders accept say 4 per cent instead of 6 per cent, the road will be clear. It goes without saying that this is a lot better than continuing to get next to nothing.

The Newburgh Public Service Corporation has also taken over the

suburban services of several independent operators, such as the Hudson Transit Corporation, on a fee basis. Hence it has a further fleet of eight Macks and three Dodges. The corporation already has a franchise to operate buses to Orange Lake, so that the elimination of the last trolley line of the Orange County Traction Company is simply a matter of improvement of the highways.

## Clerestory Roof Used in New Bus

**T**HE largest single-deck bus in northern New York State was put into service last August. Used by F. I. Dailey on his line between Watertown and Alexandria Bay, the vehicle includes a thirty-passenger body, which was custom-built by E. J. Gabourie, Watertown, N. Y., and an underslung Menominee bus chassis of 220-in. wheelbase.

Among the novel features in the body are the seating arrangement and the roof design. By taking out the seat just inside the service door, space can be provided for trunks and baggage. This space is often required, as much tourist and vacation traffic is handled.

The roof is of a form used several years ago in horse cars. This type is claimed to have two advantages over the ordinary arch construction: first, in that it gives the required headroom in the aisle; and secondly, that ventilators can be put in each end of the roof to carry out the foul air that accumulates when the windows are closed.

The seating arrangement is such that all but four passengers face forward. The seats over the rear

### Thousand Islands Operator Develops Thirty-Passenger Body Mounted on Low-Level Chassis with Built-Up Frame

wheel housing are placed back to back, so that two of them face the rear of the bus. As will be noticed, seats are not arranged to conform to the side posts but are spaced conveniently to have plenty of leg and knee room.

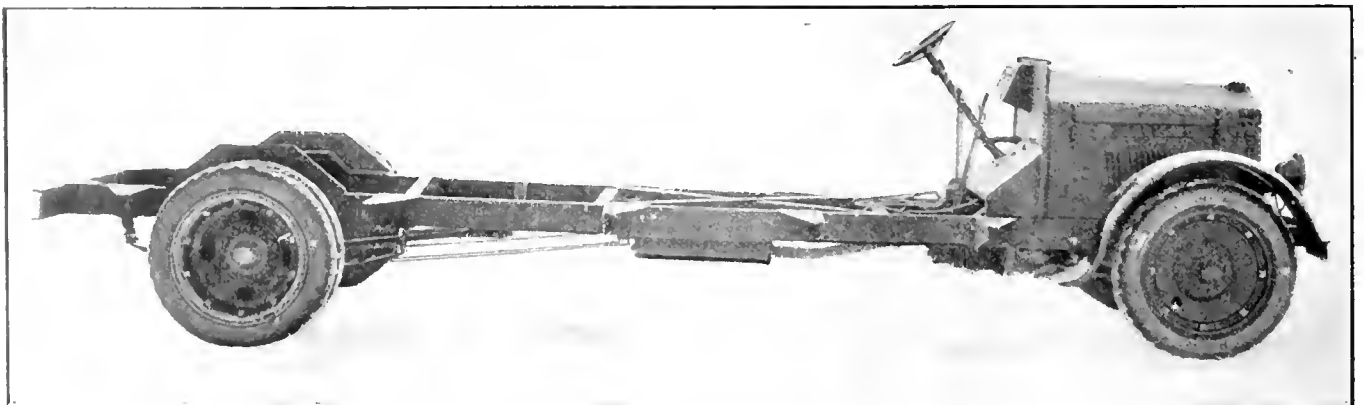
Other features include a white ceiling with the carlines showing above the tops of the drop-sash windows. All sash is of cherry. Plate-glass mirrors, 4 x 16 in., are placed on the inside of the posts to give a deluxe finish. Below the windows the finish is cherry-stained white wood.

Seats are spaced on 30-in. centers and are heavily upholstered in Spanish dark green leather. Frames are of wood with long angle-iron bracings at the corners to hold the backs in position. Top corners are cut off at 45 deg. to give hip room,

and black enamel handles are screwed on the backs to provide handholds for standing passengers. The 34 x 20-in. seat-bases are raked backward, so as to prevent passengers sliding off in going down hill. Pedestals are of wood, the seats themselves being fastened to a stringer along the interior of the body directly under the windows. The seat assembly was designed for this unit by Mr. Dailey, the owner, and built by Mr. Gabourie.

The floor has a 2-in. ramp over the rear axles. Body framing is of oak, 3 x 3 in., with cross-members mortised, screwed and glued. Flooring is birch, screwed to the cross-members. Side frame members, corner posts and side posts are white wood. The corner posts are of built-up construction, glued and screwed with 4-in. screws. Belt rail and letterboard are likewise of white wood. Carlines are mortised, glued and screwed to side posts and belt rails.

The body is mounted on an underslung Menominee chassis with six 36 x 6 pneumatic tires. A kick-up over the rear axle gives a floor



*Type of chassis used for new Dailey bus of Menominee make, with 220-in. wheelbase*



*A bus working out of Watertown, N. Y. Front view shows type of ventilator mounted at each end of roof. This bus backs against curb at terminal in city, hence the destination signs on rear end.*

height at the service door of 25 in. and at the rear of 26½ in., this with no passenger load in the body. The gage is 68 in. and 73 in. for front and rear wheels respectively.

One feature of the chassis is the protection given the front fenders. These are secured to a channel bumper, carried across the ends of the frame members. The radiator has a cast frame with a fin tubular core. Any one of the vertical tubes can be removed in case of damage or leak.

The power plant has a Wisconsin four-cylinder 4½ x 6 engine and a Cotta four-speed transmission. Ignition is from an Eisemann magneto. Starting and lighting units are of the Bosch type. A Stromberg car-

buretor and Stewart vacuum feed are used.

The muffler is at the extreme rear of the frame, exhaust gases being carried through a 2½-in. steel pipe; this has only one joint, which uses a four-bolt union.

Power is transmitted to a Wisconsin double-reduction axle, through a three-piece propeller shaft and four Spicer universals. The middle part of the shaft is supported at a frame cross-member to prevent whipping. All brakes are of the internal expansion type. The emergency has a separate drum inside of the drum used for the foot brake.

One feature not usually found in bus chassis is that the front axle

has less clearance than the rear. In this case there is 9 in. from the ground under the front axle, as compared with 19 in. under the rear axle housing.

Including seats, glass and accessories the body weighs about 3,000 lb. light, or close to 100 lb. per seat installed. All told, the bus with seated load approximately weighs 300 lb. per passenger.

Its maximum speed is 49 m.p.h., but the governor is set at 32 m.p.h. This speed is more than sufficient, since the scheduled time calls for a usual running speed of 25 to 28 m.p.h. Gasoline consumption during the first month of operation, averaged slightly more than 9 miles per gallon.



*Home-built by E. J. Gabarie, Watertown, N. Y. Seats thirty passengers. Notice how front fender sweep into step at entrance.*



# Planning Maintenance Facilities

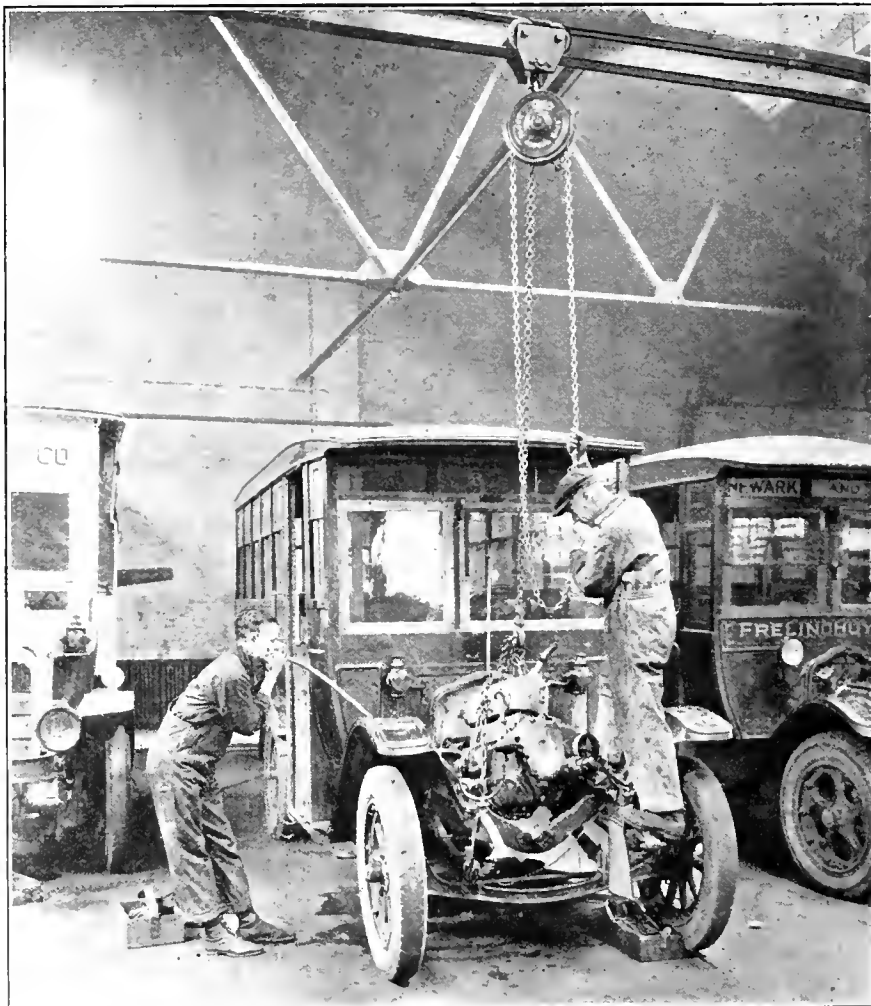
Gasoline Storage and Supply—Keeping Spare Parts—  
Getting at the Vehicle—Metal-Working Tools

**B**US maintenance is peculiar. There is no doubt about it. Servicing of the bus, all the repairs, cleaning and putting on of supplies, differs from that required for any other type of motor vehicle. The modern bus in its weight and outside dimensions compares with a 5-ton truck. It has all of the electrical equipment found on the pleasure car, as well as a lot of interior wiring, buzzers and fixtures peculiar to the bus alone.

In addition, the nature of the bus operation in itself throws an unusual job on the maintenance part of the system. Economy is needed to a greater extent than in any commercial garage. The balance must be drawn between cost of maintenance equipment as expressed by interest and depreciation charges and the return in time saved or added convenience. But more important perhaps is the requirement that the work be done thoroughly, else it comes back on the head of the bus operator in increased fuel consumption and other running charges. Also, repairs must be made quickly, if necessary, in the four or five hours when the bus is not covering schedules.

So it is not the volume of work alone that will determine what investment can be tied up in bus shop equipment. The present tendency, of course, is to use mechanical methods whenever possible. Hand work is expensive and requires a great deal of time. Proper and modern facilities mean economical and prompt handling. Cobbler-shop methods are fast passing.

The kind of equipment used in up-to-date systems is shown by the installation of the Wisconsin Motor Bus Line in Milwaukee. Here about 100 buses are cared for in a two-story shop. The first floor is devoted mainly to storage, but there is one pit, a corner and wash-rack where two vehicles can be cleaned. Part of the second floor is used for storage, but as shown in the drawing here, it also includes a ma-



*Overhead trolley system—handling bus engine in Newark, N. J., service station*

chine shop, electrical repair bench, and stock room. The machine shop has a lathe, drill press, grinding press, and benches. For electrical repairs there are facilities for testing various units, and also a magneto charging outfit. The mechanical equipment includes an engine stand, parts benches, crankshaft-bearing reaming equipment, valve-grinding outfits, and hydraulic jacks.

Safety and economy are the two important requirements in handling gasoline. In the ten-bus garage, the equipment will usually consist of an underground tank of about 1,000-gal. capacity and at least one portable wheel tank so that vehicles can be filled anywhere on the floor or outside the building.

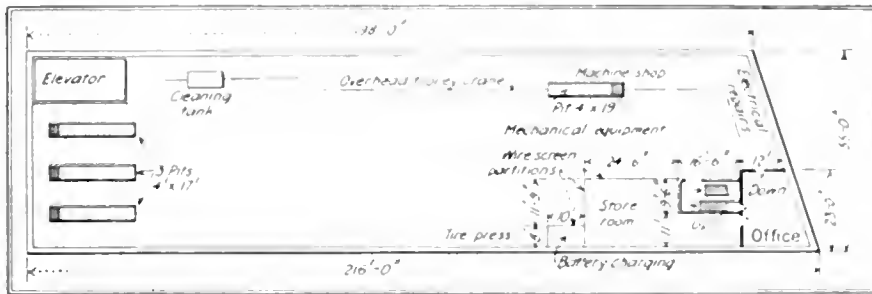
A service pump will of course be

connected to the storage tank. Usually it will be of the inside type without the housing used on outside pumps. It should have a continuous recording mechanism, such as a meter that reads up to 100,000 gal., so that the total can be compared with the amount recorded as supplied the different vehicles. In this way undue losses can be checked, such as an unusual amount for cleaning, or fueling unauthorized vehicles, or leakage from the underground system. There is bound to be some wastage in filling and by evaporation. It should not be greater than 1 per cent per month. Thus, with a 1,000-gal. tank this loss would be about 10-gal. a month.

So much for economy. The safety requirement can be satisfied by appa-

NOTE: This is the second of a series on better bus maintenance. The first appeared in the August issue of BUS TRANSPORTATION.





Second floor plan of Kinnickinnic garage, maintenance headquarters of Wisconsin Motor Bus Lines at Milwaukee

ratus—tanks and pumps—bearing the label of the Underwriters' Laboratories. This is demanded in many city ordinances, and also means better insurance rates for fire or liability. Storage tanks must usually be placed at least 3-ft. underground, and must have a vent pipe opening to the outer air. An example of an approved tank, the Gilbert & Barker Type "A," is shown here. This is galvanized both inside and outside, and the exterior protected by a coal-tar coating. From left to right the openings shown are for the vent pipe, filling pipe, and suction line respectively. It will be noticed that the filling pipe has a strainer screen

and also an arrangement for locking at the top. If desired the filling and vent pipes may be combined in one pipe, which must vent the tank when gasoline is flowing through it. When the vent pipe is separate, however, an air-type locking fill cap can be used. These tanks come in different sizes from 65 gal. up to 30,000 gal. or even more.

The locked or guarded stockroom is coming fast in all garage and service station work. It is already here in bus installations where the best maintenance practices are followed. A separate room need not be devoted to the spare parts, units, and reserve tool equipment, although

desirable in many ways. It is possible, however, to build a stockroom in the open garage by using wire netting and giving a key to this either to the foreman or some employee in charge, who is thus responsible for giving out materials, and making proper records.

In the separate room, shelving for small parts may be supplemented by racks to keep tires and wheels, and stands for springs and axles. For the small installation the Lupton Twin-unit system, as shown in the photograph, is recommended. This is built up of standard shelving but contains a variety of sizes of bins. In addition a third unit, similar to the two shown, could be placed between them, with small bins of uniform size for bolts and cotter pins.

In the absence of "flexible" mechanics, or those with arms and legs that can be given the necessary twist and turns, preparation for repairs is one of the most time-consuming parts of maintenance. Hence the importance of various devices for handling the vehicle complete, its parts or for getting at either one. Such devices are particularly useful in bus-servicing because of the general tendency to make unit repairs, even when only three or four vehicles are serviced. An overhead trolley system, a chain hoist, or a floor crane operated by hand cranks, are examples of this equipment. To get under the vehicle, pits, creepers, horses for supporting the wheels, or runways to lift the vehicle, any of these may be used according to the type of vehicle, the method of maintenance, and individual preference.

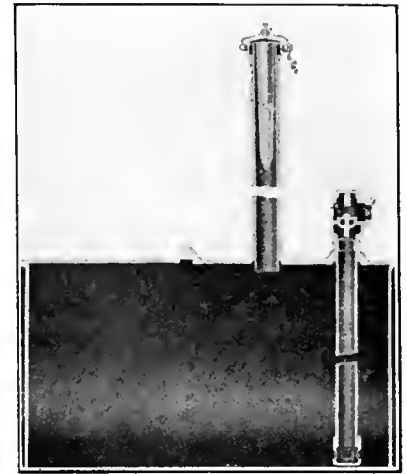
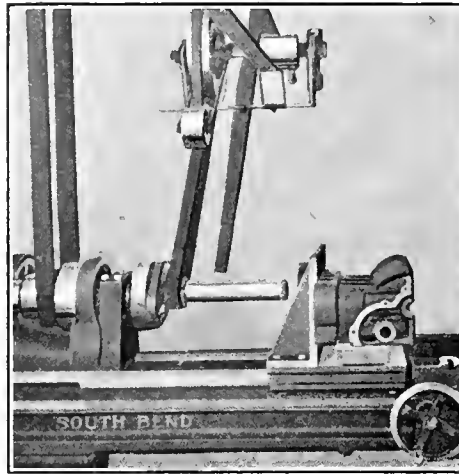
For bus service some of these are not so easily found, at least in the capacities necessary to take a twenty-five-passenger vehicle. Of course, an overhead bridge crane might be used, of say 5-ton capacity, but this is rather expensive for the ordinary installation. Some operators, however, believe it would be worth while the more readily to handle bodies. It would be useful not only in repairing but also when extra bodies were kept on hand to be moved from chassis to chassis.

Useful also is the I-beam system with either hand or power hoist. This can be installed over the entire shop or in the section used for repair work only. Engines or other heavy parts can be lifted, as with the Yale hoist shown. The one end of the vehicle can be lifted up and the wheels blocked on the other end for

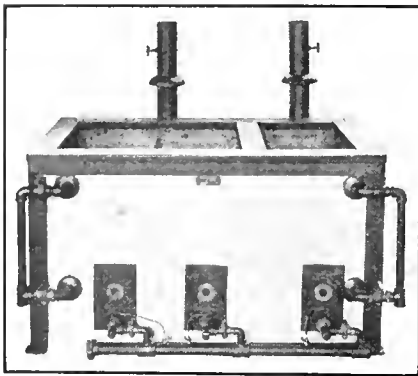


Steel-bin storage equipment. Each of the two bins is 3 ft. wide, 7 ft. high and 1 ft. deep. Finished in green enamel

inspection, cleaning and repairs. There is much work, of course, that must be done underneath, when it is not desired to take out parts, lift off the body, or hoist up one end of the vehicle. Instead of a pit, many operators prefer a table such as the Martin shown in the drawing. This has a chain hoist at the left-hand end by which the main track can be tilted until either end strikes the floor. If the bus is driven on the stand with the front wheels at the hoist, then the rear axle can be lifted so that the center is almost 4 ft. from the floor. Or, at the other end, a height of nearly 8 ft. can be obtained from the center of the front wheels to the floor. In addition jacking horses are supplied, which can be run underneath the stand. These support the front and



Left—Cylinder grinding attachment on standard lathe, an all-purpose metal-working tool. Takes fours or sixes equally well. Right—Tank for underground gasoline storage. Openings, left to right, for vent pipe, filling pipe and suction line



Cleaning tank with compartments for boiling and rinsing. Made in sizes from 32 gal. to 260 gal. capacity

rear axles so that all the wheels can be removed at the same time. For ordinary crankcase draining or many features of inspection work, the tracks can be kept on a level.

A lathe, drill press, and grinding machinery are usually put to good service in bus maintenance. When it comes to more specialized equipment such as bearing running-in machines, then local conditions must govern as to their desirability. The lathe, of course, is the all-purpose machine. For twenty-five-passenger buses, the lathe should be of not less than 18-in. swing, and 20 in. would be better. Or, a slightly smaller size can be used with a so-called gap bed arranged so that it may be used as a straight bed for ordinary work. This permits the use of the lathe for large work when required.

The drill press should be at least of 20-in. size. This will handle all ordinary work. A grinder should be mounted on a suitable stand, with

a wheel for ordinary work and one for hardened steel.

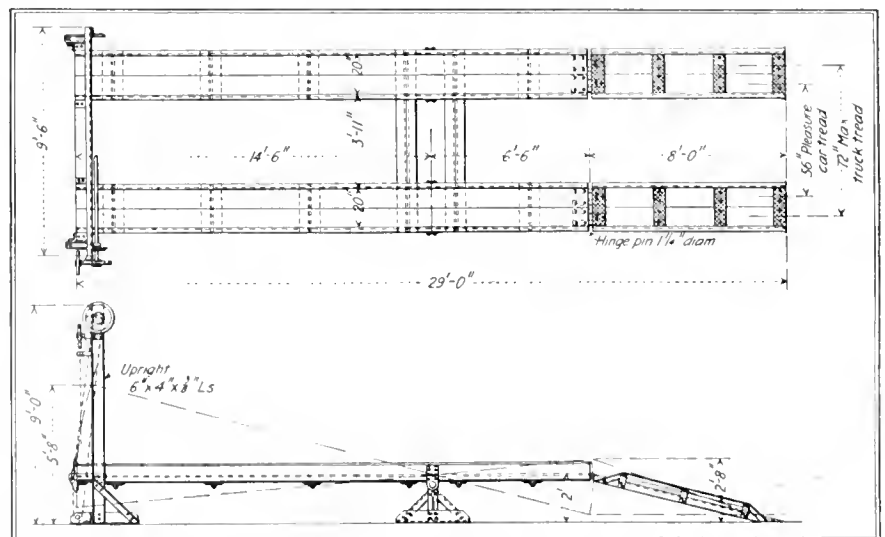
The all-purpose feature of a lathe is shown by the illustration of a South Bend machine, as fitted with a regrinding attachment. It is said that all classes of cylinders—fours and sixes—can be ground with this attachment. It is arranged to turn the grinding wheel around inside of the cylinder and, at the same time, to rotate the wheel. A lathe of this type can also be used as a drill press, for wood turning, for grinding pistons with a special attachment, as well as for the ordinary work in turning metals or in cutting threads.

In many installations cleaning vats or tanks are used. It is then unnecessary to clean dirty parts with gasoline or kerosene, with the fire risks as well as expense involved. The

illustration shows a Maehler tank, of the two-compartment type. There are two tanks in the same insulated jacket, one for a boiling solution, the other for a hot water rinse. The compartments can be heated either by passing steam through them or by gas in a chamber underneath.

Reference has been made previously to the importance of the electrical features in bus maintenance. Charging and testing devices for the battery and magneto, repair facilities for the generator and starting motor, are all useful parts.

The lighting system, inside and outside, also requires considerable attention. In a later article the subject of electrical maintenance will be considered, with particular reference to the garage equipment available for such work.



Hoist and runway for bus service. Takes wide-gage vehicle of 10,000 lb. weight. Long wheelbases can be handled on the 21-ft. runway

# Buses Handle New Jersey Traffic for Fifty Days

Figures Are Presented Showing Passenger Statistics in Nearly All Municipal Centers—Bus Men Unwilling to Sell Competing Equipment to Railway—Organize a State Body for Protection—Counsel Outlines Stand of Bus Men in Controversy



*How Broad and Market Streets, Newark, appear with and without trolley cars*

FOR fifty days buses furnished the only means of local transportation in northern New Jersey and Camden. This period extended from Aug. 1 to Sept. 20. Within four days of the last-mentioned date practically all buses were withdrawn that had been imported to meet the emergency created by the suspension of railway service. It was on an order from Chancellor Walker indicating that if trolley service were not restored he would entertain a motion looking toward the appointment of a receiver for the company that the Public Service Railway started the first of its cars.

The task of telling the complete story of how the buses met the situation is work for the historian and not the journalist, but so far as they are available the figures of passengers carried by bus in August furnish striking evidence of the accomplishments of the bus. These figures are contained in the accompanying summary. They are contrasted with the figures for July, when trolleys were in operation. The figures make an astounding showing. It has been pointed out before that on the inception of the strike 1,000,000 riders a day formerly handled by the railway had to seek new means of transport and that many of them turned to the bus. It has also been

pointed out before that it was merely a guess to hazard the number of riders per day who sought the bus. They are cold, stately things, the facts contained in the table. They spell discomfort for the rider. It couldn't be otherwise. From the transportation standpoint, however, the record spells achievement in an emergency with a great, big capital "A."

The need does not exist to attempt to elucidate all the figures. It is only necessary, as Samuel Johnson has said, to point a moral, or adorn a tale. This most any set of figures in the table does. Take for instance the case of the so-called Hudson county lines. Stretching the entire length of Hudson County from Hoboken to Bayonne is the Hudson County Boulevard. This is a broad, picturesque highway skirted for practically its entire distance with a highly developed residential district. The development of this boulevard as a highway has in fact changed the civic aspect of several communities. It is inconceivable that this boulevard should ever be devoted to anything but automotive transportation. The bus system operated over it has grown from small beginnings to a point where it ranks high among organizations of its kind. The Hudson County Boulevard buses, in fact,

tap a territory in many cases not readily accessible by electric railway. To this system as augmented during the strike a vast army turned, among them many persons who found it convenient to ride on the Hudson tubes to the Summit Avenue station, which is on the boulevard, and then travel to places nearest their destination by the buses.

With an increase of only six buses on the average, the establishing of express runs and short-line local service, an increase of 80 per cent in traffic was handled by the boulevard buses. In fact, the number of passengers handled per bus per day increased from 552 in July to 938 in August, or 70 per cent. Previous to Aug. 1, the line operating south from the Summit Avenue station of the Hudson tubes to Bayonne over this boulevard had always carried more passengers than the line operating to the north. In August the opposite proved true, for traffic on the north side line exceeded that of the south side line by 200,600.

The buses in Passaic have also handled a great increase in traffic. In this case the increase was 90 per cent with only twelve additional buses. Each of these buses handled 69 per cent more business in the month of August than in July. In Jersey City the traffic increase was

likewise heavy—in fact, with 31 additional buses there was an increase in business of 112 per cent. Newark with 419 regular buses carried 3,600,000 more passengers or 55 per cent, while the traffic handled per bus per day increased from 537 to 808. Camden traffic likewise followed the same trend. In Elizabeth, while the traffic on the lines as a whole increased 40 per cent the actual traffic handled by the buses on a per diem basis on some lines actually decreased. In fact, one line showed a loss of nearly 20 per cent after the number of vehicles had been increased by nearly 50 per cent.

#### PROPOSENTS STATE RAILWAY AND BUS CASES

After the men in the employ of the railway had been out twenty-one days the company presented a "Plan of Settlement of the Transportation Crisis." It said at that time that to resume operation on the basis of destructive and uneconomic competition such as had latterly existed would only result in a repetition at a later date of the unfortunate situation which had existed previous to the strike. So far as the operation of buses was concerned the company said that although it had never had a desire to embark largely in bus transportation it would purchase at their fair physical value all the buses operating competitively on July 31 on streets where the company's tracks were laid whose owners were willing to sell. The value was to be agreed upon if possible between the company and the respective owners of buses. If unable to agree the value was to be fixed by an independent appraisal. The company was then to operate railway and bus lines in co-ordination at a fare 1 cent less than had previously been charged. In the case of owners who did not desire to sell it was suggested that their licenses be rescinded or the buses rerouted to streets where there were no street railway tracks.

To the proposals contained in the railway's statement the Board of Public Utility Commissioners replied that the purchase and control of competitive buses by the railway could only be accomplished by an agreement by the company with the municipalities and the bus owners. The board said that it was a misstatement to indicate that the power of the board was ample to accomplish the result of rescinding the rights of bus owners who did not desire to sell

### Record of Bus Operations in New Jersey During Strike Emergency

Route	Length in Miles	No. of Buses		Passengers Carried		In-crease	Passengers per Bus per Day		In-crease
		July	Aug.	July	August		July	Aug.	
Paterson									
Main St.	2 7	14	17	295,845	608,013	106 0	682	1,152	69 0
Riverside	2 4	12	12	204,580	266,265	29 5	550	717	30 1
Totowa Borough	6 5	8	11	190,433	263,665	38 5	768	772	0 5
Hawthorne	6 6	6	6	110,635	183,612	67 0	595	988	66 0
Governor St.	12 7	5	8	107,117	197,054	84 5	692	796	15 0
Park Ave.	2 7	5	8	109,196	197,761	80 7	705	797	13 2
Haledon	6 9	5	8	105,122	157,045	49 4	678	634	6 6
Sinca	7 0	5	10	141,725	282,095	99 2	913	910	6 3
Broadway	2 1	3	5	46,545	116,386	151 0	500	752	50 4
Beech and Clay Sts.	2 3	4	6	74,688	164,113	198 0	603	882	46 5
Market St.	3 5	4	5	69,784	104,643	50 0	562	674	20 0
Graham Ave.	2 0	5	4	70,592	84,970	20 2	454	684	50 7
Madison Ave.	2 3	3	3	42,331	66,940	58 1	455	720	58 1
Prospect Park	3 0	4	4	81,070	102,467	26 7	652	826	26 5
Total		83	107	1,649,663	2,795,029	69 2	642	842	31 0
Passaic & Vicinity									
Passaic & Allwood Bus Co.	2 0	5	4	43,098	81,674	89 6	277	658	137 5
Garfield & Passaic Bus Co.	1 5	11	11	81,484	108,097	33 0	238	317	33 0
Garfield & Passaic Transit Co.	1 5	9	9	72,702	75,106	3 2	261	269	3 0
Lackawanna Bus Line		3	3	40,704	66,234	62 8	438	713	63 0
Wallington Line			6		18,470			99	
Passaic, Allwood & Bloomfield	5 5	4	4	59,534	81,513	37 0	479	657	37 2
Passaic, Garfield & Lodi	4 0	26	27	263,187	568,756	126 0	326	678	108 0
Passaic & E. Rutherford	3 0	5	5	100,238	139,515	39 5	645	901	39 7
Clifton & Passaic	3 0	4	4	30,881	46,542	51 0	249	375	50 8
Passaic & No. Newark	6 5	15	15	163,668	344,339	110 5	352	741	110 5
Main St.	2 5	4	5	32,756	111,389	252 0	264	720	173 0
Passaic & Athenia	3 00	7	7	57,055	110,113	93 0	263	507	93 0
Passaic & Columbia Park				13,238	11,847	10 5			
Passaic to Lakeview	2 5		5		57,583			371	
Total		93	105	958,545	1,821,178	90 5	333	562	69 0
Jersey City									
Bergen Ave.	3 5	71	76	372,284	888,400	139 0	169	377	123 0
Greenville	4 0	37	49	303,300	640,678	111 0	265	422	59 0
Montgomery	3 25	20	28	148,154	355,014	140 0	238	408	71 3
Laurel Hill		4	4	23,444	61,464	162 0	189	495	162 0
Boulevard South (a)	7 2	20	21	276,640	485,952	76 0	446	746	67 5
Boulevard North (a)	6 8	43	50	628,878	1,283,934	104 5	472	825	75 0
Total—Regular lines		195	228	1,752,700	3,715,442	112 0	290	526	81 5
Palisade Ave. & Congress St.	3 0	None	71	(c)					
Newark Ave.	1 5	None	111	(c)					
Grove St.	1 0	None	57	(c)					
Total—Extra Lines			239						
Bayonne Local Traffic									
Broadway	3 50	30	30	240,000	462,000	92 50	800	1,540	92 50
Hudson County Boulevard		38	38	468,400	666,600	42 20	1,230	1,752	42 20
Hook Line		4	*4	6,400	24,600	285 00	1,600		
Hudson County Boulevard Lines—Complete									
South from Summit Ave.	7 2	55	55	852,704	1,424,526	67 0	500	836	67 2
North from Summit Ave.	6 8	44	50	838,478	1,624,795	93 8	615	1,050	71 0
Total		99	105	1,691,182	3,049,321	80 2	552	938	70 0
Newark & Vicinity									
Route									
Bloomfield Ave. Line	3 40	3	4	16,842	70,814	322 0	181	571	216 0
Clinton Ave. Line	3 90	50	50	633,937	1,162,822	84 0	408	748	83 2
Grove St. Crosstown	5 25	11	11	111,133	149,230	34 2	326	438	34 2
Lyons Ave. Line	6 00	17	18	294,723	394,974	34 2	559	706	26 2
Lyons Farms Line	4 20	20	21	229,594	337,064	47 0	369	517	40 0
Market St. Line	2 90	39	40	601,642	866,076	44 0	496	699	40 5
No. Newark Line	2 50	24	24	432,348	655,638	51 5	582	878	50 7
Newark & Amper Line	4 00	12	12	223,804	380,220	70 5	598	1,020	70 5
Newark & Bloomfield Line	6 00	27	27	481,732	661,472	37 2	574	790	37 8
Newark & Eliz. (Fry's Ave.)	4 50	12	12	256,946	343,807	34 0	688	922	34 0
Newark & Eliz. (Lyons Farms)	4 60	9	9	187,465	277,227	48 0	670	995	48 2
Newark, Kearney & Arlington	3 70	34	34	693,774	947,047	36 5	657	898	36 6
Newark & West Orange Line	10 70	31	30	606,657	1,017,526	67 8	637	1,090	72 2
Port Newark Line	4 00	4	5	22,744	85,955	278 0	183	554	202 0
Roseville Line	2 25	18	18	287,807	493,998	72 0	515	882	74 2
Summer Ave. Line	2 50	12	13	195,821	279,517	42 5	524	692	32 1
So. Orange Ave. Line	3 25	44	45	654,356	1,114,770	70 0	470	800	66 8
Springfield Ave. Line	3 40	44	43	897,494	1,237,121	37 5	657	931	42 0
Stuyvesant Ave. Line	4 00	3	3	15,684	17,041	9 0	168	182	8 4
Extra Sunday trips to Amusement Resorts				28,091	14,316	48 8			
Total Local Lines		414	419	6,872,584	10,506,506	52 5	536	808	50 5
Newark-Mt. Lakes	25 40	8	5	19,000	*45,000	137 0	122	290	138 0
Newark-Butler	24 40	7	7	31,000	*60,000	93 5	143	276	93 0
Newark-Boonton	29 00	4	4	13,532	*37,000	174 0	108	298	176 2
Newark-Morrisstown	20 30	9	9	23,400	*45,000	92 2	84	162	92 6
Newark, Montclair & Paterson	14 00	15	15	65,000	*96,000	47 6	139	206	48 2
Total Long Distance Lines		40	40	151,934	*283,000	86 4	122	228	86 8
Elizabeth & Vicinity									
Elizabeth Ave.	3 0	18	29	390,625	758,487	94 0	698	726	4 0
Westfield Ave.	6 0	14	17	277,381	311,480	12 2	647	592	8 5
Elizabeth to Newark via Frothingham Ave.	6 5	12	17	256,049	291,851	14 0	687	552	19 6

\* Estimated. † Extended to 3.5 miles in August

(a) In Jersey City only. (c) No record of passengers carried. The vehicles operated are touring cars and are licensed only from week to week. Note—Figures in italics denote decrease.

The bus tower is a very important part of the bus line, but before entering the interest of the public, there must be a connection between the two forms of service, and continue in the future to improve the part. Private monopoly near excessive fares, inadequate service and the continual attempt to control routes

The 3-cent fare charged by the buses on most lines of the city is equivalent to an annual saving to the patron of the buses of approximately \$2,000 per year, besides providing a more speedy method of transportation. The bus lines therefore are giving not only good service but are saving to the public an immense sum of money annually.

We believe the courts would not support any public body which attempts to control the operation of the buses or to control the business and the fares *over* to the Public Service monopoly. No one can blame the bus men for resorting to the courts to protect the fares *upon* which they have expended so many years of service and in which they have invested so much hard earned money.

At the public hearing certain of the representatives of the municipalities stressed the point that the popularity of the buses was due in no small measure to the 5-cent fare charged by them. It all seems very simple to ascribe the popularity of the bus to the 5-cent fare. But residents of Paterson, Passaic, Newark and Elizabeth, however sincere in their belief that the 5-cent fare on the bus has been largely responsible for the popularity of that vehicle, are confronted with the cases of Jersey City and Camden. In these places the bus is no less popular proportionately than in the other cities.

No, the matter of fares does not explain it at all. The fare differential in Jersey City is all in favor of the railway, for the bus fare there is 10 cents. In Camden the buses charge a cash fare of 7 cents and sell eight tickets for 50 cents. And yet in both Jersey City and Camden while the railway charges an 8-cent fare and sells four tickets for 30

long and arduous service by the bus owners, and the bus permits thus laboriously developed were worth several thousand dollars apiece, entirely apart from the value of the buses.

At this hearing the bus men had as their principal spokesmen George L. Record, who appeared as counsel for the New Jersey Bus Owners' Association and the Central Body of Bus Owners of Hudson County, and George F. Seymour, Jr., counsel for the Essex County Bus Owners' Association. Mr. Record characterized the plan of the railway as an attempt to use the strike of the trainmen to compel the public and the commission to submit to the removal of the buses and to confer a transportation monopoly upon the Public Service Railway. He said that the business built up by the bus owners was not traffic which ever belonged to the railway. It was largely new business, created by the rapid growth of the New Jersey municipalities during the last few years. According to Mr. Record the Public Service Railway never had been, and was not then, equipped to handle this traffic, at least a third of the total served by both trolleys and buses. This bus business was created as a result of

Mr. Record said that the railway's proposed plan would simply rob these owners of the fruits of their years of toil and service, represented by the value of the permits, and confer these valuable property rights upon the railway. Moreover, the millions of people using the buses for a 5-cent fare would by the proposed plan be compelled to pay 7 cents. Mr. Record said that under the plan of settlement advanced by the railway the large investment of the company in trolleys and the comparatively small investment in buses would make it inevitable that the railway should discriminate against the bus.

The attitude of the bus men on the matter was, perhaps, stated even more succinctly in an announcement made jointly by Mr. Record and Mr. Seymour as their representatives on Sept. 17. After referring to statements made about the motives of the bus men by others which they characterized as misleading Messrs. Record and Seymour said:

Route	Length in Miles	No. of Buses		Passengers Carried		Per Cent Increase	Passengers per Bus per Day		Per Cent Increase
		July	Aug.	July	August		July	Aug.	
Elizabeth to Newark via Lyons Turn	7 0	9	9	186,766	284,210	52.7	668	1,028	54.0
Elizabeth to Linden via Edgar Rd.	3 5	3	3	49,812	59,764	20.0	535	642	20.0
Elizabeth to Linden via Railway Ave.	3 5	4	4	133,802	152,493	14.0	1,078	1,230	14.2
Elizabeth to Railway	7 0	4	4	105,861	113,135	7.5	846	912	7.8
Total		64	83	1,400,296	1,971,420	40.5	706	766	8.3
<b>Camden &amp; Vicinity</b>									
<b>Local Flat Fare Rates</b>									
Fairview No. 1	4 2	18	23	256,248	397,520	55.0	458	566	21.5
Fairview No. 2	4 7	3	6	79,693	151,663	90.0	856	815	-4.8
Westfield Ave.	4 3 5	5	14	81,955	247,660	202.0	528	570	7.9
Ninth & State	1 5	3	3	62,289	88,021	41.3	668	947	41.8
Cramer Hill	1 7 5	2	7	32,568	81,264	150.0	514	374	-27.1
Kaighn Ave. Jimneys	4 6 1 5	23	23	33,360	87,492	64.0	75	122	63.0
Public Service Ry.	2 0	0	0		Not running				
Merchantville	4 4 7	15	28	186,780	376,060	101.8	401	434	8.0
Gloicester	4 5	11	12	144,091	238,756	79.1	422	694	64.5
Collinswood & Westmont	4 4 0	10	24	153,730	509,252	230.0	496	684	37.8
Haddon Heights	6 00	0	12	Not running	93,484			256	
Cramer Hill	3 00	0	0	Not running	68,104			230	
Woodyune	2 50	0	5	Not running	61,753			398	
Pensauken	4 5	0	5	Not running	38,665			249	
Brooklawn	5 0	6	6	86,304	123,312	43.0	464	663	42.7
Haddon Heights	6 0	1	3	6,729	37,521	456.0	217	403	85.1
Blackwood & Turnerville	11 0	9	14	95,733	151,728	58.5	345	350	2.0
Marlton & Medford	18 0	5	5	23,941	36,455	52.0	154	234	62.0
Swedesboro	17 5	4	4	30,448	47,356	55.5	245	381	55.5
Berlin	18 0	6	11	41,910	118,590	183.0	225	342	52.5
Gibbstown	11 0	3	3	30,342	45,327	59.2	325	487	59.2
Salem	36 0	4	2	12,925	28,976	123.8	104	467	349.0
Williamstown	21 0	4	4	22,316	25,824	15.7	180	208	15.7
Clayton	24 0	2	2	9,684	12,402	28.0	156	200	28.2
Clementon	15 0	13			68,732			170	
Woodbury	6 0	4			23,348			188	
Total		140	242	1,410,956	3,179,265	125.3	324	424	31.5

(a) Two buses burned in fire during first part of August.

(b) Lines so marked were extended during August for distances varying from 2 to 4 miles.

In the case of the line from Newark to East Orange, Orange and West Orange the bus men really did a gracious thing. East Orange could not be made to see the bus before the strike. It would not give permits to the bus men. So when the strike was declared a fairly fashionable community of 50,000 people found itself without means of regular local transportation for hire. For five days the buses ignored East Orange. Then the utility commission took the matter up with the bus men. It was powerless to require the bus men to stop for passengers, but the oper-

One of the unexpected results of the cessation of trolley service has been the absence of noise and the extraordinary increase in the facility with which other street traffic is able to move. It is to the interest of everybody except the monopoly, therefore, that the experiment of competing bus and trolley transportation should be continued in the cities of New Jersey until a final solution of the transportation problem can be patiently worked out in the interest of everybody.

*Sample of transfer used on the Jersey City bus lines*

This challenge to the sovereign power of the state was taken up by the Gov-



# Milwaukee Railway Operates Both City and Intercity Bus Service

General Picture of System Given—Courteous Operators, Reserve Seats, De Luxe Equipment Promote Sales—Largest Mileage of Operation by a Single Company in United States—Competition Eliminated by Service

*Type "J" Fifth Avenue bus run on 10-cent fare basis with no transfers*



*The double-deck bus is popular on the Grand Avenue line*

OPERATING over 600 miles of routes, with the latest type of bus manned by selected operators of the highest type, the Milwaukee Electric Railway & Light Company, through the Wisconsin Motor Bus Lines, gives to the southeastern part of Wisconsin complete transportation coverage. Milwaukee, the largest city in the state, is the hub of the nine routes of transportation which radiate from it into the vacation "Land o' Lakes." However, the operation is not confined to a few months of the summer, for people in the rich dairy district find it possible to utilize the adequate transportation facilities, both electric and gasoline, in going to Milwaukee to make purchases.

Starting in the summer of 1919 with two small buses over a 12-mile route between Burlington and Lake

Geneva, the operation now consists of a total of nearly 100 buses covering 600 miles of routes with an operation of 322,000 bus-miles per month.

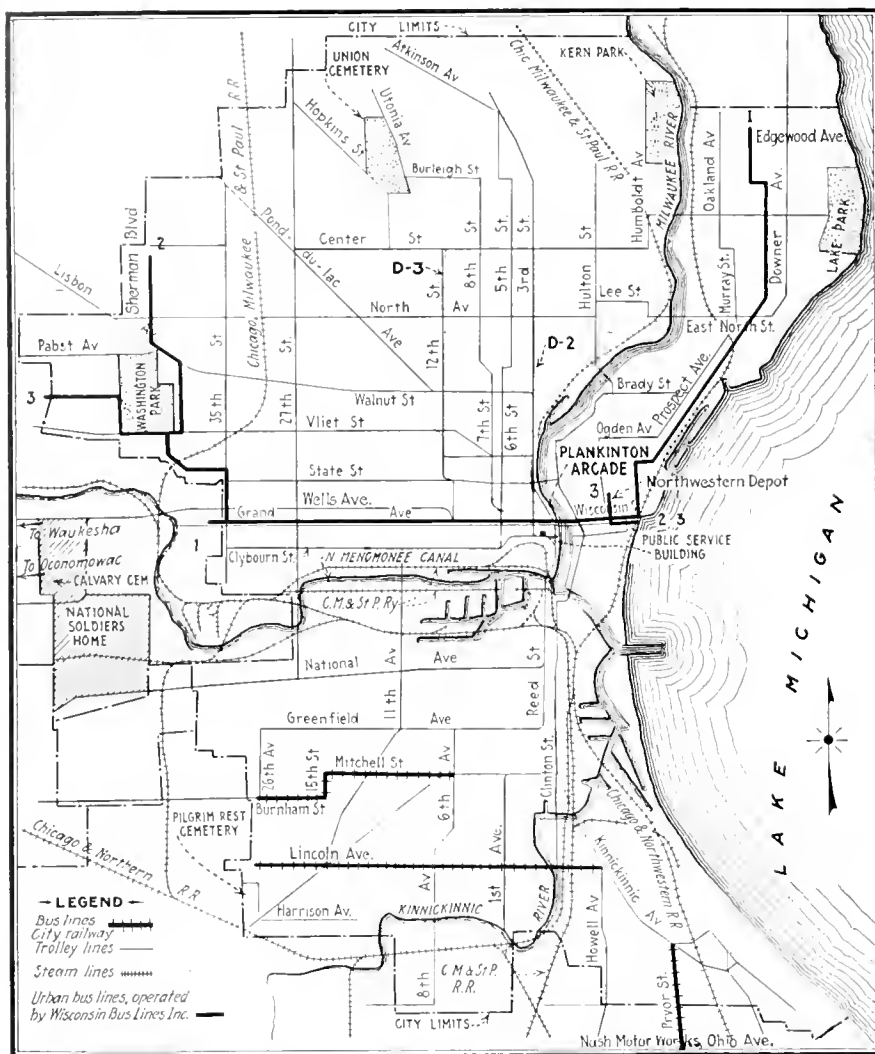
Not alone are the operations confined to intercity business, for in April, 1920, a city line of 1.5 miles was started on Mitchell Street to act as a feeder to the street car system. From this start the city lines were extended until now there are four feeder lines and two de luxe service lines in operation. To expedite traffic and facilitate transfer the feeder

*A space reservation diagram card 3½ x 9 in. is needed at terminals to avoid overcrowding of coaches on the intercity lines on week ends and holidays. Samples of tickets, which are 1½ x 2½ in., are shown*

Wisconsin Motor Bus Lines SPACE RESERVATION DIAGRAM			
Day	Date		
From	To		
Trip	A. M.	P. M.	No. of Seats to be Reserved
Space	Ticket Number	Space	Ticket Number
1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8			
9			
10			
11			
12			
13			
14			
15			

Reserved by Agent at \_\_\_\_\_

Operator's Badge No. \_\_\_\_\_ Bus No. \_\_\_\_\_



*See local bus lines are operated within the city of Milwaukee*

lines are operated by the Milwaukee Electric Railway & Light Company.

It was in June, 1922, that the Wisconsin Motor Bus Lines was organized as a subsidiary to operate the intercity bus lines and to establish de luxe service within the city. This company bought out the two independent bus operators that were operating intercity lines at that time at the depreciated value of their equipment.

Later attempts at competition have been overcome by more service from the Bus Lines.

This de luxe city service, as shown on the accompanying map, extends from the residential district on the east side down town through the business district, thence out west into the residential section. For this service the popular double-deck type of bus seating fifty-two passengers is used, giving the patron a ten-minute service, which is maintained with ten coaches. On the other branches of this operation, which overlap the double-deck operation, ten type "J" Fifth Avenue coaches are used to maintain a ten-minute



*The company has three buses of this Fageol design*

headway. A 10-cent fare is charged for this ride, the passenger being amply repaid for the additional 3 cents over the trolley fare by the delightful journey along Lake Michigan and through the parks. No standees are allowed on these coaches. On July 4 of this year 7,000 people availed themselves of this privilege.

#### TRAFFIC IS GROWING

On the intercity bus lines the vacationists and "week-enders," as they are known, have filled to capacity the equipment, consisting of fifteen Model 50 Whites of the pay-as-you-enter model, 40 limousine type Model 50 Whites, and three intercity type Fageols. In the last seven months of 1922 400,000 passengers were handled, while for the first six months of 1923 the present equipment handled 750,000 passengers. Traffic has followed closely the bus mileage, which has shown a decided increase from 90,000 bus-miles per month in July, 1922, to 200,000 bus-miles per month in November, 1922, then a falling off to 60,000 in March, 1923, followed by a rapid climb to 322,000 bus-miles for the month of August of this year.

Routes will be operated this winter providing there is co-ordination between state and county authorities, motor truck operators and the bus companies. With each doing his share the million-dollar highways of the state may be made available, but without co-operation the bus company can hardly be expected to keep open 600 miles of road for others besides themselves to use. A single-track mileage of 180, on the electric interurban lines must be kept free from snow and offers a serious problem for the operating company.

No comparison can be made between the electric and gasoline traffic because of the widely different conditions surrounding each operation. While the termini may be the same, in but one case does the highway run alongside the railway right-of-way; consequently each route serves a different group of people. The two routes are also different in character. The electric line has built up and passes through many small villages in going, for example, from Milwaukee to Waukesha, with a steady interchange of passengers. On this same route the bus passes through no municipalities and arrives at Waukesha with practically the original load.

To encourage through traffic, an

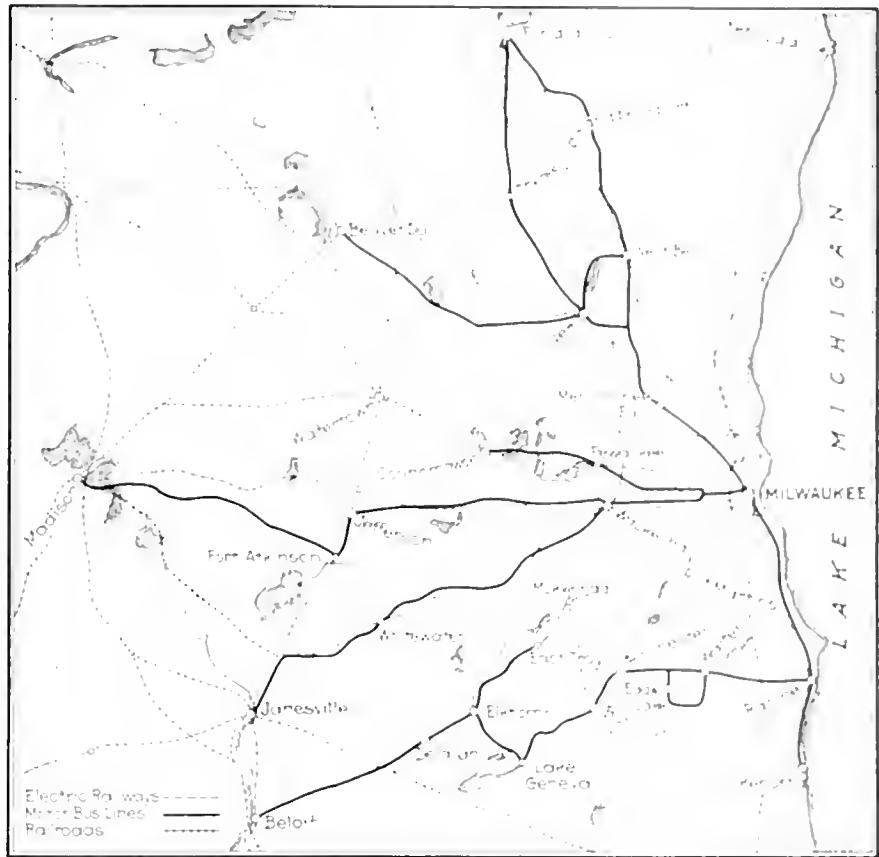
original, novel plan of reserving seats has been inaugurated. A traveler desiring to make a through trip via bus on a Saturday, Sunday or holiday, at which time the buses are usually heavily loaded, may obtain, at the time he purchases his ticket, space accommodations in the coach. No additional charge is made for this reservation, the patron merely receiving a pink ticket in place of the usual green ticket. This entitles him to a prior claim on a seat with preference to a green ticket holder, his reservation being held until leaving time. Green tickets are sold to intermediate stops and to terminal points ten minutes prior to the leaving time of the bus. If an overflow occurs another bus is provided. However, this is usually anticipated by the advance sale of reserved seat tickets.

#### MEANS OF COLLECTING FARES

Fare collection on the three systems varies. The Macdonald receipt is used on intercity buses to collect the adjusted 3.5 cent per mile rate of fare, while Rooke fare collectors are used to obtain the 10-cent fare on the double-deck buses, and the Johnson fare box collects the fare on the single-deck coaches of the street car type. On feeder buses operated by the Milwaukee Electric Railway & Light Company a locked fare box is used to collect the 7-cent fare, the operator giving a free transfer to the street car lines on all but one bus line. A charge of 3 cents is made for a transfer from the Lincoln Avenue bus line to the trolley, due to the long bus haul of 3 miles.

Comparison of intercity bus fare and interurban trolley fare shows the bus rate to be the higher by approximately  $\frac{1}{2}$  cent per mile. Even with this difference in fare, the bus has developed a business of its own. Figures indicate that the sum of bus and electric travel over a given route is greater now than the previous electric interurban traffic.

Regulatory laws of Wisconsin consist only of the 1915 jitney law, which requires a bond for each public carrier. This bond is deposited with the Railroad Commission of the state, it being necessary to obtain only the consent of the city through which the operation is to extend and pay the required vehicle tax in that municipality. No certificate of necessity and convenience is required in the state. Conflicting decisions



*The intercity bus lines radiate largely from the city and cover nearly 500 miles of highway*

of the State Supreme Court have placed in doubt the authority of the Railroad Commission.

A varying license fee for operating through cities combined with a state tax make a very indefinite cost of operation. In the so-called "Superior" case, in a decision handed down by the State Supreme Court, the Railroad Commission was apparently given the control of rates, superseding municipal control. Even with this authority the railroad commission cannot dictate the amount of the city license fee, this varying from \$10 to \$150 as the case may be. The state tax also varies, running as high as \$50 per vehicle.

Advertising of the Wisconsin Mo-

tor Bus Lines is carried on jointly with that of the Milwaukee Electric Railway & Light Company. This covers excursions, special trips, round trips and week-end journeys. Co-ordination between bus, railway, and boat has been attained, making it possible for the traveler to make numerous circle tours out of Milwaukee into the vacation land of southeastern Wisconsin. Pamphlets, schedule cards, placards, advertisements in the country weekly, and car cards in the city street cars all set forth the advantages of the "Green" bus trips. Ticket offices at all points along the bus routes are maintained in some centrally located business place on commission basis.



*There are forty of the White buses in regular service*

# Bus Operation by Electric Railways Nearly Doubles in Year

Survey Shows 92 Companies Operating 760 Buses—The Largest Railway-Owned Organization Is in Wisconsin—Details of Operation

**N**EARLY 100 electric railway companies now operate more than 700 buses over the routes totaling 1,069 miles in the United States and Canada. Fifteen more are at present contemplating the installation of bus service.

These figures are the result of a survey recently completed by BUS TRANSPORTATION and indicate that the number of railways operating buses has almost doubled since Sept. 1, 1922. There were then fifty-six companies, using 350 buses over 123 routes totaling about 900 miles.

Information as to the routes operated by each company, the date service started, the number of buses assigned to each route, their average seating capacity, the rates of fare charged, the amount of service rendered and the average amount of traffic handled monthly has been compiled and is presented in the accompanying table.

An analysis of the figures shows that the Central States have the largest number of railway companies operating buses.

Considering the number of vehicles used the Western States are rapidly overtaking the Eastern States, which, however, still lead with 192 buses in operation. There are 170 on the Pacific Coast.

The largest railway-owned bus company is the Wisconsin Motor Bus Lines, Inc., operating 100 buses. Over 600 miles of highway are covered by this line.

The next largest operation is that of the Pacific Electric Railway with sixty-eight buses running on eleven routes in southern California. A subsidiary of the United Electric Railways of Baltimore, Md., ranks third with forty-six vehicles on four routes in the city of Baltimore totaling only 7 miles. The service of the Baltimore Transit Company, there-

fore, is much more concentrated than that of the two other companies mentioned.

## TYPES OF VEHICLES

Wide variation in the seating capacity of the buses used is indicated in the statistics. The heavy duty type of vehicle, seating from twenty-one to twenty-nine passengers, is the favorite for urban operation, while on a number of the inter-city runs the limousine type of bus with a smaller capacity is used. In only four cases are double-decked vehicles found in operation.

## FARES

The fares charged vary according to local conditions. Very often the rate on the buses and trolleys is the same. Especially is this true when the bus lines reach into city centers. In the case of feeders, the cash fare may be the same, but the joint fare is often one or two cents higher.

## Statistics Regarding Motor Bus Operations by Electric Railways as of Sept. 1, 1923

Name of Road	Routes Operated	Service Started on	Length in Miles	Number of Buses Assigned	Average Seating Capacity	Headway		Running Time One Way	Fares Charged			Daily Mileage Scheduled	Average Passenger Traffic per Month
						Normal	Rush		One Way		Transfer to Trolley		
									Cash	Ticket			
NEW ENGLAND STATES													
Connecticut													
The Connecticut Co.,	Brooklawn to Ash Creek	7-23-22	2 10	1	18	30	30	12	10	3(a) 25	Free	167	.....
Bridgeport Division	Depot to Tunnel	8-25-21	0 64	1	14	10	10	5	10	3(a) 25	Free	78	.....
Hartford Division	Maple Ave.	11-10-21	3 60	2	25	20	20	20	10	3(a) 25	Free	310	.....
	West Hartford	12-5-21	4 39	1	14	a	a	30	10			69	.....
New Haven Division	New Haven to Bridgeport	7-15-21	12 00	3	25	60	.....	50	*60	3(a) 25	Free	740	.....
	New Haven to Branford	7-15-21	3 40	2	12	45	.....	24	30	32(a) 25	Free	.....	.....
Stamford Division	Soldiers Home Noroton to Hospital, Stamford	7-11-21	3 40	2	21	30	b30	29	10	3(a) 25	Free	465	.....
Waterbury Division	St. Joseph's Cemetery via Hamilton Ave.	10-7-21	2 00	1	13	30	530	15	10	3(a) 25	Free	160	.....
	Highland Ave. and Walnut St.	11-12-21	2 75	2 4	13	20	12	20	10	3(a) 25	Free	280	.....
Danbury & Bethel St. Railway Co.	Lake Ave. Belt—Danbury	8-6-21	2 90	3	14	20	10	20	10	25 \$2	Free	224	12,000
	Bethel extension	8-15-21	1 25	1	14	20	10	10	10	25 \$2	Free	90	9,000
	Danbury to Putnam Park	6-1-22	6 70	1	14	.....	.....	25	25	None	Free	121	600
Groton & Stonington Ry. Co.	New London to Mystic	5-22-23	2 00	2	28	60	60	30	30	None	Free	230	.....
	New London to Eastern Pt.	5-22-23	6 00	1	28	60	60	30	20	None	None	240	.....
	New London to Golden Spur	5-23-23	6 00	1	28	60	60	30	20	None	None	250	.....
Massachusetts													
Boston Elevated Ry. Co.	Faneuil to Cambridge St. R.R. Station, Allston	2-24-22	.....	5	25	15	7½	11	5	5	10	333	57,000
	Medford St. and Fellsway to Malden Sq.	2-21-23	.....	4	25	15	10	9	5	5	10	330	76,000
	Linden to Malden Sq.	3-28-23	3 2	4	25	15	10	10	5	5	10	348	52,000
	Medford Hillside to Fellsway	5-1-23	.....	3	25	20	10	11	5	5	10	361	53,000
Connecticut Valley St. Ry. Co.	Greenfield to Turners Falls	11-4-22	3 13	1	17	1 hr.	.....	20	10	.....	None	133	6,000
Holyoke St. Ry. Co.	Dwight and Maple Sts. to Northampton and Sargent Sts.	7-14-21	1 50	2	25	20	10	10	6	6	None	208	230,000
Springfield St. Ry. Co.	Hamburg St. to State St.	5-1-23	.....	1	25	30	30	15	7	7	Free	76 7	6,128
	Springfield to West Springfield	2-2-23	.....	2	25	15	7½	7½	7	7	Free	111 1	27,986

\* Minimum fare 10 cents. a Eight trips weekdays, six trips Sundays. b Trips doubled during rush hours.

Name of Road	Routes Operated	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2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<sup>a</sup> Reduced rate tickets ranging in rate. <sup>b</sup> Good on first zone in Beverly only. <sup>c</sup> 12 cents through fare. <sup>d</sup> Through fare of fare 15. <sup>e</sup> 10¢ fare. <sup>f</sup> Transfer good only part of distance — to Pierce Mill Rd 1913, to Jan. 5, 1924. <sup>g</sup> Trolley buses. <sup>h</sup> Permit granted, so far as fare is concerned, to Jan. 5, 1924. <sup>i</sup> Monthly mileage scheduled.







# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, October, 1923

## *The Railway Proves the Bus*

**W**HEN it comes right down to cases, many criticisms of the bus generally accepted as being true are on careful examination found not to be really so at all. Difficulties with winter operation, falling off in real estate developments because of the fancied lack of permanence, greater cost as compared with any and all rail systems—all of these bugbears can be overcome under proper management and operation. That they are being overcome is amply demonstrated in many of the articles in this issue, which, in large part, is devoted to current developments in the electric railway field.

The achievements here recorded, however, will be a source of pride and satisfaction to all interested in the bus as a medium of transportation. Its strength, its essential soundness, when routes are properly chosen and operations efficiently conducted, are shown not only by the testimony of officers of these railways, but also by the practices they are following.

Perhaps the most significant development is that shown in small town local service and in interurban rail service through sparsely settled communities. Most of these have been hit hard in recent years. Many cities of from 25,000 to 50,000 have rail systems worrying along with safety car equipment and single-track operation; continually between two fires, it was impossible to make any money even with frequent headways, because people could, and would, walk to their destination more quickly than if they waited for a car. In Everett, Wash., and Newburgh, N. Y., this has led to almost complete replacement of the rail system with buses. It is unnecessary here to mention the whys and wherefores, since the articles telling the whole story appear in this issue.

On the interurban systems, an example is afforded by what is happening on the Groton & Stonington Traction Company's line. The rail service is still supplied, but forms only half of the complete schedule. Bus and rail cars are run alternately over practically the same route.

In Louisville, where the officials of the local traction company believe that the bus is destined to form an essential auxiliary of the present system

of local transportation, a bus line is being operated on Third Street, with rail lines still in service on the parallel and adjacent streets on each side. Certainly this is an example of supplying service and giving the customer a chance to follow his preference as to the medium in which he may wish to ride. The electric companies, in general, are avoiding many of the mistakes that have led them into trouble in their rail operations of past years. One of the bus lines described in the Danbury article follows two different trolley lines, but instead of supplying simply feeder service, the traction company runs the buses as a loop line, so that people will not have to change to get down town. Undoubtedly, this is good business and is reflected in the receipts. Service to the public must be accompanied by efficient and economical operation. They are also going after this thoroughly.

Maintenance stations are being built with up-to-date equipment, operators are being well trained, accounting systems are being worked out so that the bus operations can be properly supervised, on the basis of complete knowledge of all the fundamentals which, of course, are necessary to the success of any bus system. The flexibility of the bus is being taken advantage of, in the way of charter or livery business—a class of business long since lost to the railway lines.

At the Atlantic City Convention of the American Electric Railway Association, in honor of which this issue of *BUS TRANSPORTATION* has been devoted largely to articles descriptive of the use of the bus by electric railways, the bus promises to hold an important place. There will be reports on operation, maintenance and accounting, and an exhibit of equipment that will indicate the amazing strides the industry has made in the past year.

—[ EDITORIAL ]—

## *Route Signs that Tell the Story Are Needed to Get the Riders!*

**P**ASSENGERS must be pampered. It is not enough just to carry them. It is not enough to provide modern equipment in which they may ride. The service must in every case be sold. In this work the employee is perhaps the most important factor. The cases of the Fifth Avenue Coach Company and the Chicago Motor Coach Company prove this. But the employee, no matter how courteous he may be, works at a disadvantage unless the implements supplied to him are a help rather than a hindrance. All this is apropos of two new lines of buses established recently the equipment of which is all that could be desired and which fill a real need so far as supplying service over a route not previously covered is concerned. These routes have been arbitrarily labeled A and B. There is no quarrel with the desire of the operating company so to designate the routes, but to do so and do nothing more leaves the public out in the cold, so to speak, and puts the employees operating the buses at a decided disadvantage. So far as the operators of these particular buses are concerned they are being called upon to answer many unnecessary questions. Route signs giving

destination points properly displayed could be made to answer them just as well, and advantage is being lost of the advertising which such route signs give to the service. Fully realizing this, the operator of one interurban service has labeled the sides of his buses and the backs of them with the story of their destination. These are de luxe vehicles, but the signs do not in any way detract from the trim appearance of the cars. Another operator has painted the names of the towns that he serves on the back windows of his buses. It is all part of the sales game to display merchandise to the best advantage, and a good way to do that is to label things plainly. This applies to the sale of transportation no less forcefully than it does to the sale of merchandise.

The regular traveler may come after a while to know Routes A and B intimately, but even he will be gratified at knowing that the vehicle in which he is riding proclaims its destination from its front and possibly its sides, while to the casual rider the fact that the vehicle is carefully labeled gives him a sense of security as to where he is going that even the most reassuring utterances from the driver does not always convey. A quite famous expression of the present day is "Let's go." A worthy ambition is there expressed. But it is well to know whither one is headed before he starts.

—[ EDITORIAL ]—

### *Highways for 100 per Cent Service*

**O**NLY a few states in the snow belt are making any effective attempt to keep the roads open during the winter months. Connecticut and Michigan, perhaps, have done more than any other states to recognize the importance of motor vehicle traffic in general and have undertaken, as part of their highway maintenance program, to clear snow from the main state highways.

This work does not usually include the clearing of the main routes when they pass through cities or towns. If the cities and towns take care of the work in their own territory, then with the state and county authorities clearing the rural highways, it should be possible to follow almost any main route by motor car, bus or truck with little if any more inconvenience than in the summer.

That the roads should always be kept in passable condition is strongly advocated by the bus owner and operator, who pays in licenses and taxes for the right to operate his vehicles over state and city highways, not for six or eight months each year but for twelve. The bus operator will argue, therefore, and justly, that if he is forced to keep the roads open so that he may operate his own vehicles, his passengers must bear an unnecessary expense not really a part of his cost of rendering service.

Transportation should be available at any time of the year. The increasing use of closed cars of the privately owned type is bound to result in a greater mileage of cleared highway. There is no good reason why the people in the smaller towns and along the rural highways should be imprisoned during the winter, or perhaps forced to use slower means of transport than the bus.

### *Right of Way at Grade Crossings*

**T**HE slogan of the American Railway Association, to "cross crossing cautiously," is agreed with in a statement issued by the United States Bureau of Public Roads, but at the same time the question is raised as to whether under certain conditions the railroad traffic should not exercise the caution, and "hold right" and give the right of way to highway vehicle.

This may seem rather foolish at first thought, at least to railroad men. But consider the case mentioned by the bureau, where one of the principal highways leading west of Raleigh, N. C., crosses what is really a railroad siding, serving the State Fair Grounds. This switch track is used for only a few days a year during the Fair, yet under the North Carolina law all the traffic over the main road must stop at this crossing 365 days a year.

The general application of grade crossing law to both trunk and branch lines indiscriminately is bound to lead to absurdities and unnecessary inconveniences. In many states bus operators alone are required to stop at crossings, and the law does not apply to the many irresponsible drivers of private motor vehicles. Why should not the principle followed by the railroads, of giving right of way to the most important traffic, be recognized by utility commissions and legislatures. Infrequent trains on branch lines would then stop before crossing important highways, instead of tempting highway traffic to violate what seems to be a foolish regulation.

The real remedy, however, is closer legal supervision of the drivers of the privately-owned automobile. Bus operators as a rule are men of discretion and judgment. Otherwise they do not last long. But it is a comparatively simple matter for the most incompetent driver to get a license for a private automobile, and to have many traffic violations and minor accidents to his credit, before he winds up at a grade crossing, with death not only for himself but often for passengers on the railroad train or in his automobile.

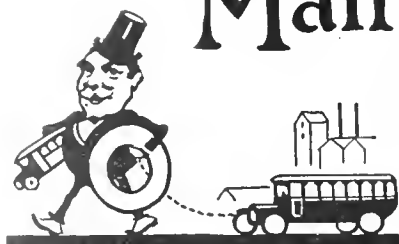
[ EDITORIAL ]

### *Develop the Express Business*

**P**ROFITABLE business can often be developed by the stage companies that will give a little attention to encouraging shipments by express. In the state of Oregon this is demonstrated by what has been done in handling express at the Portland union stage depot. A service such as is rendered there should attract business in other parts of the country quite as effectively.

A particularly good place to start is with the dealer who stocks automobile parts. In his line of business the advantage of being able to use a frequent service carrier is of first importance. Having the schedule of departures, he can deliver packages to the depot up to the actual moment that the stage leaves the terminal, thus offering his patrons a service that could not be approached in speed by any other carrier now handling express.

This business is easy to develop, easy to handle, and makes friends for the operating company.



# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Lubrication by Compressed Air

A NEW grease gun has been put on the market by the Automotive Lubricating Company, San Francisco, Cal. The manufacturer designates it a Hi-Power compressed air grease instrument. Air pressure can be taken from a spare tire, from the tires on the vehicle, or from the compressor in the garage. The attachment used on the gun fits any ball-check, valve-type lubricator. By a patent automatic control inside the gun, the pressure forced into the lubricator is thirty times that of the air force entering it, so it is possible to get as high as 3,000 lb. of grease pressure.

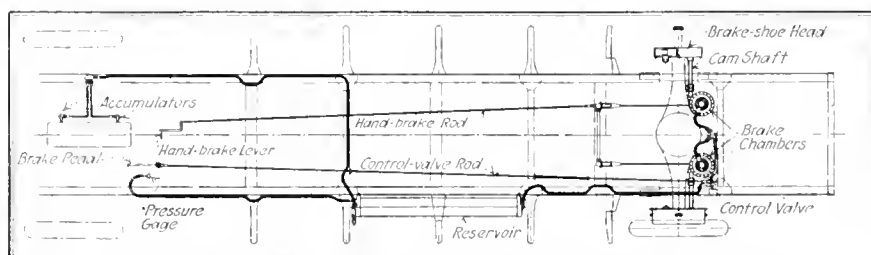
Completely filled with grease, the gun weighs only about 5½ lb. In addition to grease it is recommended for discharging 600-W oil, kerosene, water, or any liquid regardless of how light or heavy bodied it may be.

After the air is connected, a button or trigger on the instrument is depressed. Each time this is done a stick of grease about ⅜ in. diameter and 1 in. long is shot out of a so-called firing chamber into the nipple. At the same time the firing

chamber is automatically reloaded and the high-pressure plunger returns to the firing position. The trigger also returns automatically to the firing position.

## Metal to Metal Brakes Applied by Air

THE air-brake equipment previously described in these columns (see page 36, January, 1923, issue BUS TRANSPORTATION) has now been



Layout of Westinghouse automotive air brake with air chambers mounted back of rear axle

successfully applied with metal to metal brakes. The accompanying illustrations show a close-up of the brakeshoe construction, and also a layout of the mechanism controlling the brake chambers.

There are two accumulators attached to the engine, which permit "air" to pass into a large reservoir mounted alongside the left-hand frame member. Pressure in this reservoir varies from 75 to 150 lb.

The system is operated by what appears to be the usual brake pedal. This is connected through a rod and bell-crank lever to the control valve, which is placed at the rear of the chassis. It is thus possible to secure any braking pressure desired by varying the stroke of the pedal. A retrieving spring is set on the connecting rod so as to balance involuntary foot pressure during braking operation.

Another new feature of the brake is the location of the brake chambers on the rear axle housing. The push rods in these chambers are then connected to levers mounted on the brake camshafts. The same brake camshaft can also be controlled

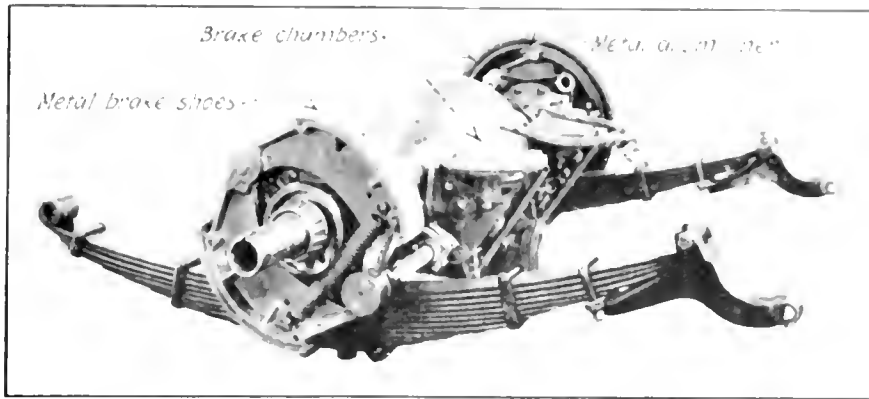
through a system of rods leading to a hand lever at the driver's seat.

The Westinghouse metal-lined brake rigging consists of two steel shoes in each rear wheel. These are bolted to steel shoe heads and bear against a steel liner which is bolted to the drum. The shoe heads are hinged on a large anchor pin supported by the spring-seat castings, and are operated by 180-deg. constant lift cams, the latter being supported on tubular shafts.

Metal-to-metal air brakes were developed on the Fageol city-type buses in the service of the Puget Sound International Railway & Power Company, Everett, Wash. These buses weigh 9,600 lb. empty and 16,100 lb. carrying the maximum of fifty passengers. The schedule speed must be kept up to 9.7 m.p.h., requiring at times a maximum speed of 25 m.p.h. On some of the lines where these buses are operated they come to a full stop on an average of forty-seven times an hour. When the ordinary manually-operated brakes were used in this service the fabric



A high-speed lubricating device from the Pacific Coast



*Rear axle equipment for metal-to-metal air-operated brake*

lining had to be renewed every four teen to twenty-one days and the drum every ninety days. With the new metal-lined brake, air-operated, the metal shoes need be renewed only after 15,000 to 20,000 miles, while the results so far indicate that the metal drum liners will last at least a year. Besides their longer life between renewal periods and the possibilities for making renewals more quickly and cheaply, the metal-lined brakes are said to be more effective, with a higher factor of safety. The cause given for this is that they are consistent and reliable in operation and are not subject to the inherent variables of fabric lining.

### Rubber Bumpers Added to Spring Device

THE Hiflex spring suspension, a product of Traylor Engineering & Manufacturing Company, Allentown, Pa., is now being built with rubber bumpers in place of the metal stops formerly mounted on the side

of the main frame members. These bumpers are placed inside the helical springs. In case a severe bump is encountered, the shock is taken up by the bumpers, instead of the springs closing together. The ends of the bumpers are cone-shaped; when they come into play, a very small surface is struck, thus eliminating or decreasing noise, and at the same time making for resiliency.

As indicated in the illustration, the Hiflex suspension is not an auxiliary mechanism, in the ordinary sense. Rather, it is an integral part of the chassis, although it can be installed on practically any vehicle. Two main purposes are served. First, it increases considerably the length of the main springs and thus gives the flexibility that goes with long springs. The hinge device and to a considerable extent the helical springs are thus in action all the time. In the second place, it serves as the compensating device, the helical springs coming into play more and more as shocks or bumps are en-

countered for when additional loads are carried. The nature of this device put forward as one of its important advantages is the fact that an installation can be made in only two hours, and adjustments intelligent mechanics can make in many minutes. The springs and side-chamber are made of wire, giving from 15 to 20 in. of travel, one inch of travel for each inch of travel of the other, giving a total of 30 in. of travel, or practically 3 feet, for each inch of travel of the other.

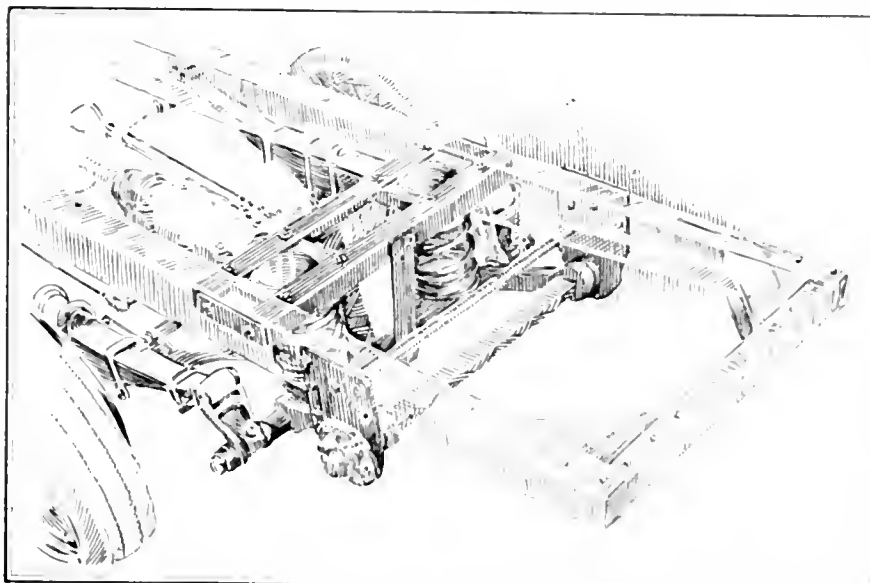
With Hiflex installed on the rear of the chassis, the riding qualities of the front are materially benefited, it is said.

### Fuel Tank Inclosed in Trunk on Canadian Bus

THE Gottfredson Truck Corporation of Detroit and Walkersville, Canada, has brought out a bus chassis. This is shown here equipped



*Gottfredson bus chassis with C.G. springs, no bumper. Radiator protected by steel bars*



*Hiflex suspension mounted between rear end of frame and spring shackles*

with a twenty-two-passenger sedan-type body built by the Canadian Top & Body Corporation, Ltd., Tilbury, Ont. The chassis has a 178-in. wheel-base and weighs 4,400 lb. This gives a total weight of 8,400 lb. or about 380 lb. for each seated passenger.

Tires are of the "doughnut" type, 32x6 front and 32x6 dual rear, on Budd disk wheels. Power is taken from a Buda bus engine, 1x5, in. bore and stroke with counterbalanced crankshaft, through Brown-Lipe multiple-disk clutch and Brown-Lipe four-speed transmission to a Timken worm drive rear axle. Electrical equipment is all American Bosch and includes magneto, starting motor and generator. A thirteen-plate 200 amp.-hr. Exide bus-type storage battery is part of the equipment, as are

# Condensed Specifications of Motor Vehicles for Bus Service

Revised to October 1, 1923

Trade Name and Model	Main Dimensions			Engine Details										Electrical Equipment				Transmission		Axles		Steering Gear	Springs	Brakes	Wheels		Tires																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	Capacity, Seats	Unloaded Weights, Lb.		Wheelbase	Cage, Front	Cage, Rear	Floor Height	Steering Circle Dia., Ft.	Normal Speed, M.p.h.	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Battery	Battery, Amps, Vols.	Starter	Generator	Clutch				Gearset	Front		Rear	Final Drive																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Chassis	Rus	Wheelbase	Cage, Front	Cage, Rear	Floor Height	Steering Circle Dia., Ft.	Normal Speed, M.p.h.	Maker	Bore, Stroke	Fuel Feed	Carburetor	Cooling	Radiator	Ignition	Battery	Battery, Amps, Vols.	Starter	Generator	Clutch	Gearset	Front	Rear	Final Drive																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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*Extra wheel and tire supplied with this Gotfredson chassis. Notice the position of the filling pipe for fuel*

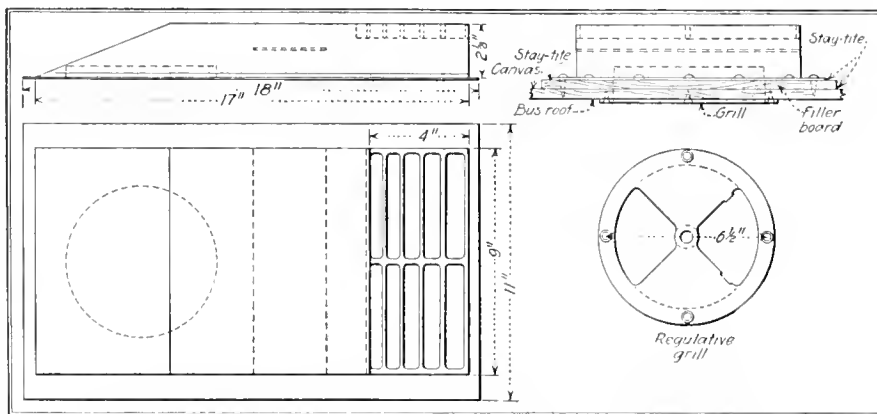
also 9-in. drum-type head-lamps and a combination tail lamp and stop light.

Fuel is carried from a tank in a trunk at the rear of the body, through copper tubing, to a Stewart vacuum tank on the dash, and then to a Zenith carburetor through Titeflex metal hose. A spare wheel, as shown in one of the photographs, is mounted on a rigid casting at the back of the frame.

Each side of the body has five doors, one opposite each seat, except the one over the wheel housing seat. There are three heaters under the seats and two ventilators in the roof. The doors, which are an important thing in this type of body, are the heavy sedan-type, 30 in. wide, fitted with large hinges and locks. Each one has a check strap of harness leather, outside handles and dull silver inside latch. In fact, all interior lamps and hardware are of dull-finish silver. Seats are trimmed with Spanish grained leather and seat backs and door lower-halves in imitation leather to match the seats.

### Street-Car Type Body from Canada

THE accompanying photograph represents a product of the Canadian Top & Body Corporation, Ltd., Tilbury, Ontario, Canada. Of



*Bus ventilator for heavy-duty vehicles; has regulative grill*

the street-car type, it has capacity for twenty-nine passengers. With a length, dash to rear, of 21 ft., width at windows of 7 ft., and headroom of 6 ft. 3 in., the body weighs only

3,300-lb. for shell and equipment.

Equipment includes six lighting outlets for the interior, each carrying a 12-cp. lamp; a heating system of 1 1/2-in. pipe at each side under the seats, and three Nichols-Lintern ventilators mounted in the roof.

Ash and maple are used for the framing, with panels of 18-gage auto sheets. Roof covering is double texture Pantasote over 12-oz. duck. Inside the ceiling is finished in white, with natural wood oak below windows.

### New Ventilator Has Optional Grill Regulation

THE Nichols-Lintern Company, Cleveland, Ohio, has developed a new ventilator which is said to be much more efficient than previous types. As shown in the drawing, the type "CC" ventilator is built up of galvanized sheet steel and aluminum. The outside is sheet steel, so that in

case of collision with a low roof or door, the ventilator will give way without materially injuring the bus roof. It is designed for installation along the center line of the roof, the sloping part being at the front, and the opening for the exit of air at the rear. The opening inside the bus is covered by a polished aluminum grill which may be regulative or non-regulative, as desired. If of the former type, the grill is provided with a sector-shaped member, arranged so as to cover the grill.

The type "CC" ventilator is recommended for vehicles of large passenger capacity, where not less than 2,500 cu.ft. of air must be exhausted per hour. Two ventilators should be used for sixteen to twenty-passenger buses, not less than three for twenty to twenty-five passenger, and four or more for twenty-five to thirty passenger buses.



*Mack chassis with body made by Canadian Top & Body Corporation, Ltd.*

# What the Associations are doing



News and happenings  
of the associations  
Proceedings of interest  
to the bus transportation  
industry.

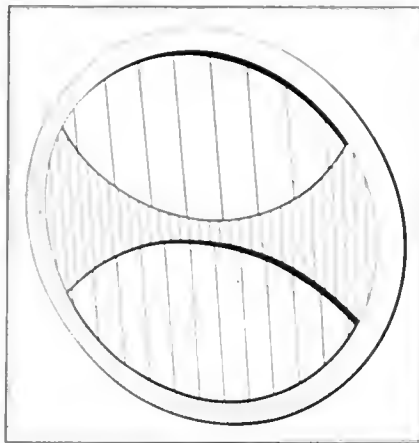
## Better Headlamps and Their Adjustment

Automotive Engineers Discuss Methods of Eliminating Glare and Securing Good Illumination—New Type of Lens Described—  
Rules for Focusing and Aiming

**C**OMPLETE and rather detailed directions for securing good road lighting from headlamps were presented on Sept. 20 before the New York Section, Society of Automotive Engineers. These were contained in a paper on the importance of better automobile headlamps and proper adjustment, given by R. N. Falge and W. C. Brown, engineers of the National Lamp Works, Cleveland.

Particular emphasis was laid upon the focusing or location of the bulb in the reflector, and on the directing of the reflector. The headlamp, it was said, is a very sensitive device. Accurate and well-adjusted equipment must be used, because the distances from the filament to the reflector and the lens are so short as compared with the distances ahead of the vehicle to which the light is projected.

The leading manufactures of incandescent lamps and non-glare equipment are now trying to eliminate the focusing adjustment, according to the authors of the paper. It appears impossible to eliminate the aiming adjustment, however. The new precision lamps which have been put on the market within the last year are a step in the direction of a fixed socket. These lamps have filaments located within about one-half the S.A.E. tolerances for focal length, but they still require focusing adjustment. This adjustment will become less important when the lamp is less sensitive to filament location about the focal plane.



*New lens to simplify head-lamp adjustment. No focusing required with this construction*

With the lens shown in one of the illustrations, it is possible, with fairly accurate equipment, to compensate for commercial variations in filament positioning in the reflector. At the same time, the light in the beam projecting from the reflector can be distributed effectively. It will be noticed that this reflector has really three zones. The central zone, it is said, tilts the light rays downward slightly and these form the upper part of the beam. The top or cut-off of the beam is thus maintained substantially at the level of the headlamp. Rays of light from upper

and lower zones of the lens are deflected downward by the prism construction, so that they will not rise above the top of the beam from the middle zone. This holds even when the filament is moved forward or back of the focal point through relatively wide limits.

The beam in this new form of headlamp is of the approximate elliptical shape shown in the illustration. A slight amount of light is thrown above the line A.A., which represents the level of the center of the headlamps, but not enough to cause glare. It is sufficient, however, to illuminate pedestrians and overhanging obstructions. At the bottom, the beams spread out so as to light up the sides of the road near the vehicle and assist in making turns. It is understood, also, that the boundaries of the beams satisfy the legal requirements generally enforced by the various states.

### HOW TO ADJUST HEAD-LAMPS

In suggesting the rules given in this paper, the authors emphasized the importance of keeping the headlighting equipment in reasonably good condition. The outer surface of the lenses should be washed from time to time. Each time a bulb is removed, and oftener if necessary, the reflectors, the lamps and the inner surface of the lens should be cleaned carefully. Even after the adjustments suggested have been made, they should be checked at frequent intervals. This can be done by watching the faces of people in approaching cars. If you can distinguish these faces by the light from your own headlamps, your lamps are glaring decidedly. Another check is to direct the beams from the lamps against a vertical surface, such as a garage door. Or it may be viewed from about 100 ft. ahead of the vehicle. This is especially important in buses, where the vibration and handling may change the focus and aiming materially. The headlamps should, of course, be refocused and re-aimed each time either one of the lamps is renewed.

Almost all non-glare equipment in general use, stated the authors, is designed for the "at focus" position, and the following directions are intended



*Head-lamps properly focused without lenses. This should be the smallest spot obtainable*



*Light distribution provided by accurately constructed head-lamps equipped with non-focusing lens*

for use with such equipment and with such a bulb setting:

1. *Use only 21-cp. Gas-Filled Headlamp Bulbs.*—Lamp bulbs should be uniform and efficient in performance throughout their life. They should have highly concentrated filaments to give the minimum beam divergence. The filaments should be placed accurately with respect to the locking pins and to the axis of the base to minimize beam distortion. They should not sag in service. If new lamps do not give a fairly white light with the engine running at a speed corresponding to 18 or 20 m.p.h., have the battery inspected before proceeding with the adjustment. If lamps have been burning out at short intervals, inspect the connections from the generator to the battery and replace any defective socket, fuse or connection.

2. *Polish Reflectors* with a soft cloth dipped in powdered lamp black.—Fogged, rusted or defective reflectors should be replaced with new ones; they should not be replated. If the gasket cord provided to make an airtight seal between the lens and the reflector is loose, fasten it back in place with shellac.

3. *Focus the Lamps in the Reflectors.*—Move the lamp forward and backward in the reflector until the filament is placed with respect to the reflector so that the spot which is thrown on a vertical surface 25 ft. ahead of the vehicle will be of the minimum size and approximately round, as shown in the figure. With fluted reflectors that spread the light to either side, the filament is properly placed when the spot is shallowest in the vertical dimension. In either case, the top of the beam should cut-off as sharply as possible. Turn the lamp over in the socket when the beam is not satisfactory as first installed. This may improve the lighting.

4. *Install Redirecting Equipment.*—Where the ordinary redirecting lens is used, be sure that it is placed in the headlamp door so that the wording on it reads properly from the outside and that it is fastened securely so that it cannot rotate away from a vertical position. Where fluted reflectors are used, they in themselves accomplish the spreading of the light and require only a plain cover glass. It is important that flutes be in a truly vertical position.

Install one door, with the glass properly fastened in it, on the headlamp and hold the other door loosely in front of the other headlamp in the proper position. Cover first one door and then the other. The spots from both, as seen on the vertical surface, should look practically the same. If they are noticeably different, it means that the focus has been disturbed in installing the door, possibly due to the fact that the reflector moved back on the springs and the lamp position remained the same. Refocus the lamp so that both beams will look the same. Install

## Meetings, Conventions and Exhibits

- Oct. 4—Auto Bus Association, New York State, Onondaga Hotel, Syracuse.
- Oct. 8-13—American Electric Railway Association, Annual Convention, Atlantic City, N. J. (includes exhibit of buses and accessories).
- Oct. 13-28—Dallas Automotive Trades Association, Annual Fall Show, Dallas, Tex.
- Oct. 25-26—Society of Automotive Engineers (Production), Cleveland, Ohio.
- Nov. 12-17—Automotive Equipment Association, Annual Business Exhibit and Convention, Coliseum, Chicago, Ill.
- Nov. 13-15—National Tire Dealers' Association, Annual Meeting, New York City.
- Dec. 16-15—National Petroleum Institute, Annual Meeting, Statler Hotel, St. Louis, Mo.
- Jan. 5-12—National Automobile Show, Eighth Coast Artillery Armory, New York City.
- Jan. 22-25—Society of Automotive Engineers, Annual Meeting, Detroit, Mich.
- May, 1924—International Motor Transport Congress, Detroit, Mich.

the other door and refocus in the same manner.

5. *Aim the Beams.*—Place the vehicle on a level stretch with a garage door or other vertical surface 25 ft. ahead. Sight through the center of the rear window over the radiator cap and mark a point on the vertical surface at the same height as the lamp centers. Draw a horizontal line through this point and on it locate points at the right and left of the center line directly ahead of each headlamp, as indicated by AA in the figures.

On most makes, a universal joint or a slot under one of the bolts fastening the headlamp to the fender or the frame is provided to facilitate aiming. On a few, it will be necessary to bend the headlamp bracket. With one headlamp covered, center the spot from the other on the vertical line through the point A directly ahead of it, and tilt the beam to the point where its top or cut-off is just below the horizontal line AA. In a similar manner, the other headlamp should be aimed on the point A directly ahead of it.

When adjustments are made properly, a shallow band of light will be thrown upon the vertical surface with its top just below the horizontal but with a low intensity diffused light above the horizontal line. The road surface will be so well lighted that the driver can pass other cars conveniently and safely. It is possible that oncoming drivers may at times signal to the driver to dim. Intolerable glare has been so common in the past that, whenever drivers see headlamps illuminated with a white light, they anticipate trouble.

Under a few conditions glare results even with headlamps properly adjusted as, for example, when the vehicle is coming over a rise. Under such conditions, drivers should, of course, dim for both cars and pedestrians.

Not only the importance of proper adjustment, but also the necessity for

more rugged and durable equipment, was urged by the speakers, who took part in the discussion following the paper. Reflectors are imperfect and sockets will not stand up. Both of these should be improved, it was said, so that the lamps will stay put for a reasonable length of time after they are once directed properly. It was announced that the Society of Automotive Engineers is considering the standardization of lens notches, so that the lens once placed in a reflector cannot twist and get out of adjustment.

### BETTER EQUIPMENT URGED

Dimming is a much more frequent cause of accidents than glare, it was announced by A. W. Devine of the Massachusetts State Motor Vehicle Department. In his state, he said, there were three accidents due to insufficient light for every one from glare, these figures being based on a record of some 400 fatal accidents. He was heartily in favor of the fixed-focus construction, so that it would be necessary only to tilt the lamp down to secure proper lighting.

F. H. Ford, of the C. A. Shaler Company, makers of a lens for headlamps, objected to the method of adjustment recommended. It would be simpler and easier, he held, for the average motorist to follow an official pattern as conveyed by photographs. This pattern would represent the required kind of lighting, and the lamps would be simply adjusted to get it as nearly as possible. Mr. Ford objected, also, because only one focus was considered, which could be used only with a limited number of non-glare devices.

### New Jersey Men Form State Association

OPERATORS of Buses in New Jersey has formed a state organization known as the Allied Bus Association for the purpose of mutual defense. The association will contest any attempt to revoke the existing bus permits on the ground that they constitute a property right. The association also will endeavor, by the policy of widespread publicity, to keep the public informed of the affairs of the association. In anticipation of the primaries on Sept. 25 all candidates for public office were asked to sign a pledge to vote against any bill designed to give the Public Service Railway a monopoly and to vote against any bill to give any person or corporation the right to operate buses in any community without the consent of the local authorities. The association has established offices at 20 Clinton Street, Newark, and at 15 Exchange Place, Jersey City. The chairman of the executive committee is H. L. Brewer, who is president of the Camden County Bus Association. George L. Record, Jersey City, who is counsel for the Hudson County Bus Association, is also one of counsel for the new association.

# News of the Road

From wherever the bus takes its rightful place, together, the impact of its events, here presented to show the movement of the day.



## Boulevard Bus Service Begun in Philadelphia

**Rapid Transit Company There Announces Extensive Plans—Los Angeles to Have 100 More Buses by 1924—Birmingham, Ala., Railway Granted Bus Franchise**

PHILADELPHIA is to have a complete, city-wide bus service, augmenting the trolley and subway-elevated system there, according to a recent statement by Thomas E. Mitten, chairman of the Philadelphia Rapid Transit Company directors.

The announcement came with the starting of bus service on Roosevelt Boulevard. The first buses began running there on Sunday, Sept. 23. It is the first attempt at a scheduled service on a uniform basis co-ordinated with the city's established transportation system. For the present the open-top type double-deck bus will be in use pending further study of the semi-inclosed top vehicle which the company's engineers have begun to develop.

The line runs from Broad Street and Erie Avenue north to Wingohocking Street, to the Roosevelt Boulevard, to Foulkrod Street, to Oxford Avenue, then to Frankford Avenue and Arrott Street. The time of the one-way trip is forty minutes. Ten machines are in operation throughout the day, with more running in the rush hours to provide additional service. They are operated on the basis of a seat for every passenger.

"The double-deck bus with semi-inclosed top, which was used as an exhibit at the time the ordinance for bus operation on the Roosevelt Boulevard was under consideration, represents a development of our own engineering forces, in company with those of outside manufacturers," said Mr. Mitten.

"New York city, with the greatest experience in bus operation, has developed a bus similar to the one described, but with an entirely open top. Chicago has further developed this type of bus, and is now operating many and building others to supply the needs of that city.

"Philadelphia must have the best, and since all recognize that the Roosevelt Boulevard bus service is but a forerunner of an almost city-wide system to come, the P. R. T. has under construction a full equipment of our own type of buses with semi-inclosed tops, and in addition has purchased ten of the New York-Chicago open-top type, so that we may be able later, by actual experience, to determine which type of bus best meets all our city's needs."

The present plans of the transit company are to establish a bus service to the central business district from the West Philadelphia section to relieve the surface and elevated lines serving a part of that territory. The plans call for bus operation from Sixty-third and Walnut Streets to Broad and Sansom Streets.

Bus service was begun in Trenton, N. J., on Sept. 1 by the Central Transportation Company, a subsidiary of the Trenton & Mercer County Traction Company. Two routes are operated. One runs from Montgomery Street to the Empire Rubber factory, a distance of 1 mile. The other, from Davis and Lalor Streets to Olden Street and Princeton Avenue, is 3.5 miles long. Five twenty-five-passenger Model 50 White buses are used. Service is run on an hourly headway, with a thirty-minute headway during rush hours.

### NEW BUSES FOR LOS ANGELES

From California comes the news that the Pacific Electric Railway and the Los Angeles Railway Corporation, which jointly own and operate the Los Angeles Motor Bus Company, are to add approximately 100 new twenty-five passenger motor buses to their bus service in Los Angeles before Jan. 1, 1924, co-ordinating with the existing trolley lines of the two respective traction companies. These buses, it is stated, will be used in rendering motor bus service recommended and approved by the Board of Public Utilities of Los Angeles.

They will include the sixteen motor buses that were placed in service on the crosstown bus line on Western Avenue on Aug. 18 last. It is stated that approval of the plan to extend the railway systems into new territory, first by means of motor buses, will be of untold value to the city, since costs of street car line extensions are prohibitive these days except where immediate and future profits are assured. It is the plan to give the city of Los Angeles one of the most complete transportation systems in the country.

The bodies for a large number of the buses are being constructed in the Pacific Electric Company's shops at Torrance, Cal. Single-deckers as well as double-deckers will be operated in this service, according to plans.

Los Angeles is to have a new bus line for the present year. The city of Los Angeles will spend \$1,000,000, which will be a addition to the city's revenue. The city is to operate a new motor bus line, which will be operated independently by the Los Angeles Railway, as well as the city's five motor buses, independently operated by the Pacific Electric Company. According to its local street car system, Pasadena, Cal. Norddeutsche is to operate sixteen motor buses, operated independently by the Pacific Electric Company, a franchise to its lines in Beverly Hills, Alhambra, Glendale, San Bernardino, Redlands and Santa Ana.

Three more electric railways have been granted certificates of operation for bus lines, as follows:

The Birmingham Railway, Light & Power Company of Birmingham, Ala., will establish a line of motor buses to Tiddlesville, a suburb, and down Sixth Avenue, Birmingham, to the entrance of Elmwood Cemetery, according to an announcement of J. S. Poyner, receiver. This is a part of the reorganization plan of the railway, he said. No date has been set for the installation of the service.

In Arkansas the Arkansas Central Power Company has been granted permission to operate a bus line over the Sweet Home Pike, from the end of the company's trolley line at Bidde to Farrell, a short distance away.

Permission to operate a bus line from Waterloo to Cedar Falls, Iowa, was recently granted the Waterloo, Cedar Falls & Northern Railway by the Iowa Railroad Commission. Reports do not indicate when this service will be started.

### SAN FRANCISCO WATERFRONT TO HAVE BUSES

Establishment of a motor bus line on the Embarcadero, San Francisco, Cal., advocated by shipping and business men of the city for many months, is expected to become a reality within a few weeks following action taken recently by the public utilities committee of the Board of Supervisors of the city of San Francisco.

Following an announcement of Charles H. Spear, president of the State Harbor Board, that the State of California is ready to subsidize the bus line to the extent of \$18,000 a year, the committee recommended that an ordinance be introduced at the next meeting of the board which will assure the bus service. The ordinance will be so drawn that it becomes effective at once, it is said.

Proponents of the bus line declare they have been assured by members of the board that sufficient votes will



be cast to make the service a certainty. The ordinance, which will be up for approval before the board soon, will authorize the Board of Public Works to advertise for bids for the necessary buses and to enter into a contract for their immediate delivery.

According to the present plans the bus line will give and accept transfers from both Municipal Railway and Market Street Railway cars. It was stated recently that officials of the railway companies have signified their willingness to issue transfers if this will insure the success of the new line.

President Spear of the Harbor Board stated recently that all legal difficulties in the way of the bus line had been cleared away by the opinion of the attorney general of California that the state can appropriate money for a bus line subsidy.

#### BUS SERVICE EXTENDED IN YOUNGSTOWN, OHIO

Additions and changes in the south side district bus service, Youngstown, Ohio, were announced recently by Railway Commissioner Harry Engle.

The changes are part of the program for the enlargement of the motor bus service to be made by the purchase of thirteen new buses, four of which have been placed in service.

Mr. Engle said it is planned to revamp the old service and create two new lines, bringing the total to six, three on each side of the Mahoning River.

The old Indianola route buses will leave their present loading stand at Market and Boardman Streets, operating over Champion to Front, to Market, to Woodland Avenue, over Woodland to Hillman Street, thence over and along Hillman to a terminal at Delason and Hillman. Buses will turn around at Gertrude Place and will return by the same route. These buses will be marked "Hillman Street."

South Avenue buses will leave their present loading stand at Market and Boardman Streets and proceed over and along Champion, Front, over South Avenue Bridge and out South Avenue to Lucius, thence over Lucius to Market Street. The buses will turn on Market to Avondale, in Avondale to Southern Boulevard, over Southern Boulevard to Lucius, thence in by way of Lucius and South Avenue as at the beginning. These buses will be marked "South Avenue."

A new and third bus route has been inaugurated. This route will proceed from the loading place at Market and Boardman, thence to Champion, to Front, to Market, out Market, to Hylda, over Hylda to Edwards, out Edwards to a terminal at the intersection of Judson and Edwards, returning by the same route. These buses will be marked "Indianola Avenue."

On leaving the downtown waiting stations, the buses will operate on express schedules without stopping, to Market and Evergreen, from which point they will make all the stops to their respective terminals. They will,

however, pick up passengers at any point on Market Street who wish to go to any part of the southerly district.

If buses are loaded on return by the time they reach South High School, they will proceed without stopping to their downtown terminals.

#### MARYLAND CITY MAY HAVE COMPLETE BUS SYSTEM

Hagerstown, Maryland, may soon have a bus system operating on a fixed schedule and covering the entire city. William W. Barr and Clyde W. Middlekauff of that city recently applied to the Mayor and Council for a permit to operate buses there.

The city officials will grant the franchise, it is said, after a permit has been secured from the state Public Service Commission.

The company plans to operate three bus lines covering different sections of the city. The buses will operate on a twenty-minute schedule between 6 a.m. and 11 p.m. and a fare of 7 cents will be charged. Transfers will be issued from one bus to another. The company plans to sell fifteen tickets for a dollar and to permit children under six years of age to ride free. Through its attorneys the company has already applied to the Public Service Commission for permission to operate.

## British Bus News Summarized

Municipal Tramways Association Discusses Private Enterprise Competition—  
Buses May Not Compete With Tramways in Greenock—  
Stoke-on-Trent Issues Strict Rules to Stem Tide of Buses  
—Radio Aiding British Bus Lines

AT THE annual conference of the Municipal Tramways Association at Portsmouth in the latter part of August some discussion took place on the question of the competition of buses owned by companies or firms with municipal tramways, and much complaint was made on the opposition of private enterprise. One opinion put forward—strange as it may seem—was that companies' buses were taking money to which the ratepayers were "clearly" entitled. A point of discussion was the necessity for placing buses on the same footing as tramways as regards contributions to road maintenance, etc. The executive council of the association is considering the subject with a view to legislation being introduced in Parliament. The whole trouble, it may be noted, of British municipalities who operate tramways arises from the fact that when they went into the business there was no possible competitor to the tramcar and they thought they had the ball at their foot. So they had for a time, but now the motor-bus has come along, and they are dismayed to find they are no longer monopolists.

On a cognate subject—the competition of municipal buses with company buses—a wordy warfare went on during August in the pages of *Motor Traction* between that journal and A. R. Fearnley, general manager of Sheffield Corporation Tramways and Motors. The former championed the cause of the companies and objected to the municipality competing with the companies on roads outside the city boundaries. Mr. Fearnley maintained the right of the corporation to carry on as it was doing for the benefit of the public, and he pointed to competition between companies, which sometimes resulted in smaller ones being run off the road. Many of the old arguments for and against municipal enterprise which were employed in the case of municipal and company tramways were brought out again and the case remains just where it was.

We often enough hear of arrangements whereby British municipalities get protection against competition by companies, but sometimes there is a reverse arrangement. The tramways in Greenock are owned and worked by a company, and recently the Town Council obtained Parliamentary powers to run omnibuses. The condition was made, however, that the Council is not to run the buses in competition with the tramways. The latter consist of one long east and west line near the waterfront, so that the buses will be confined to the more inland parts of the town, which are excessively hilly.

There has been a plethora of buses in Stoke-on-Trent vicinity owing to the freedom with which the Town Council granted licenses. That is now proposed to be changed, and the Council has drawn up a specification to which vehicles must conform, also a set of rules regarding routes to be served, time tables and insurance. The specification and the rules are of a detailed and exacting character, so that the Council has gone to the other extreme. It is evident that there may be cases of hardship to individual bus owners, and these will doubtless be taken into view by the Ministry of Transport when considering whether it will sanction the regulations. Meantime further negotiations are going on with the bus owners on the question of "rationing."

F. G. Briston, general secretary of the Commercial Motor Users' Association, in an address on the relation of broadcasting to the motor industry, stated that wireless would in his opinion make its popular appeal to the ever-increasing number of motor coach users. Anything which tended to increase the pleasures of a trip in one of these vehicles, such as the attraction of "listening in" to a favorite instrumental or vocal item while enjoying a run in the country, should be encouraged. The great advantage of being able to communicate with any of the passengers during the trip,



should any urgent need make it necessary to do so, should not be overlooked. Already quite a number of coaches have been equipped with wireless sets.

During the August holiday season in Great Britain the number of accidents associated with buses and other motor vehicles appeared to be the greatest on record. One reason put forward is that such vehicles have of late increased enormously in numbers. There can be no doubt, however, that in the case of private cars and motor cycles at least there is a great amount of unskilled and also of reckless driving. Bus undertakings usually put their new drivers through a period of training, and it is the private car that is frequently the source of danger both to its occupants and to other people. The charge before the police courts of "being drunk while in charge of a motor car" is becoming alarmingly common. It is not surprising that the public demand for a test for all motor drivers is increasing. The London Safety First Council proposes that every driver, before receiving a license, should be officially examined and tested as to technical and physical fitness. At present anybody can obtain a license without question on the payment of a small fee.

The Safety First Council, which is now advocating further propaganda for the education of the public and of vehicle drivers with a view to avoiding accidents, is hampered in its work because it is unable to raise an annual income of about £1,100. The hope is expressed that the government will allocate part of the revenue from motor taxation to safety first purposes and will encourage municipalities to sanction expenditure from the local rates on accident prevention work.

### Ask \$50,000 Fund to Clear Roads of Snow

Bus and automobile owners of Albany County, N. Y., recently asked the county Board of Supervisors to appropriate \$50,000 for clearing the main highways of the county of snow next winter. A resolution embodying the request was unanimously passed at a meeting of sixty-two representatives of the various towns of the county in the Chamber of Commerce rooms in Albany. It was pointed out at the meeting that practically all of the \$50,000 would be available for actual snow removal, as there is said to be sufficient equipment already on hand in cities and towns of Albany County.

The Chamber of Commerce announced that it has two big steel snow plows available for snow removal. Other towns throughout the county have considerable equipment, statements by various representatives brought out.

Emphasis was placed upon the point that appropriation of the \$50,000 would not necessarily mean the expenditure of the entire sum as with a mild winter much of the money could be saved.

### Radio Talk on Motor Buses

**"WHAT the Bus Is Doing as a Medium of Transportation"** is the subject of a radio talk to be given by Carl W. Stocks, editor of *Bus Transportation*, from station WJZ, New York City, Wednesday evening, Oct. 24, from 8:15 to 8:30 p.m.

This is one of a series of radio talks by McGraw-Hill editors on technical subjects.

Speakers said the highways were in such a condition last winter that even doctors could not get through to treat many critical cases. Action on the petition will be taken by the Board of Supervisors in the near future, it is said.

### Praise for St. Louis Bus Service

Congratulating the personnel of the People's Motor Bus Company on the efficiency of its bus service, Clinton H. Fisk, Director of Streets in St. Louis, declared recently that not one complaint had been received in his office of impolite or discourteous treatment of the public. He stated that his inspectors had used the buses at various intervals and had yet to encounter an unsatisfied passenger.

Safety Engineer Patterson of the St. Louis Safety Council also complimented the bus drivers for their careful operation of the buses. He warned them, however, that they must be ever on their guard against carelessness on the part of others. "You yourself can drive well, but you must always keep in mind the man who cannot. He is your responsibility also."

### Special Service by St. Louis Buses

The People's Motor Bus Company, St. Louis, Mo., recently started a special Forest Park service for patrons desiring to visit the big West End recreational center.

Under the new arrangement alternate buses on the Washington-Delmar line were routed from the Eads Bridge west on Washington Avenue to Spring, north to Delmar Boulevard, west to De Baliviere Avenue and thence southward to Jefferson Memorial in Forest Park. The buses returned over the same route. During the St. Louis Municipal Opera season and also during the St. Louis Fashion Show, which was given in the Municipal Theater in Forest Park, the bus company routed every other bus on the Washington-Delmar line to the theater. The service proved popular, a large proportion of the theater-goers using the buses. The special Forest Park Sunday service was put into effect in response to popular demand.

### Bus Possibilities Unlimited, Says Fifth Avenue President

President of the Fifth Avenue Coach Company, Inc., said today that the possibilities of the bus are unlimited. In the recent past, he pointed out, the general public has been told that the trolley is the only means of mass transportation.

"You can go a long way," he added, "with a trolley, but the bus is the only means of mass transportation that is not limited by the trolley's track. The bus is the only means of mass transportation that is not limited by the trolley's track."

A letter of inquiry to the company, asking for information regarding the bus, was received by the company's representative.

### Bus Supplants Trolley in Westport

All trolley traffic in Westport, Conn., except those of the trolley bus, is to be discontinued. The trolley bus service is to be continued, but the trolley bus is to be replaced by the electric car, a decision announced by the trolley bus company.

This step is said to have resulted from action taken at a town meeting of the citizens, who voted 101 to 58 in favor of substituting buses for the trolleys. L. S. Stone, president of the Connecticut Company, which operated the electric trolley, has signified his intention of abiding by the decision of the voters.

### Shanghai to Have Bus System

One more Chinese city is to install a bus system. The long talked of motor bus service for Shanghai is treated fully and assuringly in a prospectus just issued by the China General Omnibus Company, under the general management of Arnold & Company, a long-established British concern in China. Approval has been obtained from the Municipal Council, it is stated, for the operation of buses over ten routes covering the main traffic arteries of the International Settlement.

The capital of the company is 1,000,000 taels, and it is proposed now to issue 500,000 taels of shares. The company proposes to purchase at the beginning thirty motor buses of the most modern and approved type. A technical representative of the company will at once visit America and England to settle this matter. Operation of the buses will be commenced over four of the more important routes with a six-minute schedule and extra service morning, noon and afternoon during the rush hours. The route for the first and second lines will be decided after investigation of the roads. Expert opinion in traffic and transportation will be procured by the company's representative when he goes on his tour of investigation in the United States and England.

### Scranton Suburbs Want Bus Service

Resolutions calling upon the Pennsylvania Public Service Commission to permit operation of buses between Minooka and Pittston, Pa., in the event that the Scranton Railway is allowed to abandon its lines between the two points were passed recently by the City Planning Commission of Scranton. The Scranton Railway has petitioned the Public Service Commission for permission to tear up 6 miles of track running through suburbs south of the city.

### Shore Line Incorporated in New Jersey

The Shore Line Bus Company has been chartered at Trenton, N. J., with \$100,000 capital to operate buses between Newark and Keansburg and other towns along the route. The new company, it is said, will give service to towns formerly served by the Central Traction Company, which operated along the upper New Jersey coast. The concern will operate twenty-five buses. Harry Silverstein, David J. Hall and Edward Baker of Bergenfield are the incorporators of the company.

**Bus Permit Granted in Face of Railway Opposition.**—Despite the opposition of the Missouri, Kansas & Texas Railway of Oklahoma, the Corporation Commission of that state recently granted the application of Baird & Brown for authority to operate buses between Bartlesville and Pawhuska, Okla. The commission held that the public necessity for the bus service proposed by Baird and Brown was clearly established. The fare between the two cities was placed at \$2.

**Indianapolis-Terre Haute Bus Line Started.**—With the initial trip of a Nation Trails Transit Company bus from Indianapolis to Terre Haute, Ind., Sept. 2 the connecting link between points as far west as Effingham, Ill., and the seaboard was forged. The trip was made in record-breaking time and constituted the official opening of through bus service between Terre Haute and Indianapolis. The company will operate connecting schedules on the National Old Trails Highway between Effingham, Ill., and Washington, D. C.

**Bus Monopoly Denied Railway.**—Monopoly of the bus transportation business from Springfield, Mass., to the Eastern States Exposition grounds, near the city, from Sept. 16 to 22, was denied the Springfield Street Railway by the State Transportation Board. Instead the board empowered Thomas H. Benton, Supervisor of Buses, to obtain every possible bus in the city to handle the crowds during exposition week with the understanding that the patrons, who now depend wholly on the bus, were not to be deprived of that service.

**Mayor Backs Bus Application.**—Mayor Walter E. Drumbheller of Sun-

bury, Pa., testified before the Public Service Commission at Harrisburg as to the necessity of a bus line running between Sunbury and Liverpool, on the west side of the Susquehanna River. There has been opposition to the line from some quarters although strongly

favored by people living along the Susquehanna Trail. The west shore has been utterly lacking in transportation facilities, and any person desiring to travel has had to ferry across the river at Liverpool to catch a train on the Pennsylvania Railroad.

## Tabular Presentation of Recent Bus Developments

Name	Lines Started Address	Route
George Frash	Barron, Wis.	Barron to Chippewa Falls, Wis.
Inter-Urban Bus Line, Inc.		Bound Brook to Somerville, N. J.
Webb Auto Co.	Mena, Ark.	Mena to De Queen, Ark.
John I. Reichert	Long Prairie, Minn.	Wadena to Little Falls, Minn.
Interstate Transportation Co.	La Crosse, Wis.	Bismark to Raleigh, N. D.
Rifenburg & Son		La Crosse to Black River Falls
Howard Ashell	Huntsville, Mo.	Evaleth to Hibbing, Minn.
Motor Transit Co.	Greenfield, Ind.	Huntsville to Moberly, Mo.
Cadwell & Lewis	Beaver Dam, Wis.	Muncie to Indianapolis, Ind.
National Bus Co.	New Brunswick, N. J.	Beaver Dam to Watertown, Wis.
West End Transportation Co.	Mt. Horeb, Ia.	New Brunswick to Cranbury, N. J.
West Shore Transportation Co.	Manitowoc, Wis.	Dodgeville, Wis., to Dubuque, Ia.
Taylor & Pace Service Car Co.	West Plains, Mo.	Cedar Rapids to Dubuque, Ia.
		West Plains to Mountain Grove, Mo.
Permits Granted		
Bohl Bros.	Cohoes, N. Y.	Cohoes Streets
Jones & Leach		Canandaigua to Penn Yann, N. Y.
Pine Ridge Rd. Passgr. Line, Inc.	Rochester, N. Y.	Rochester to Hilton, N. Y.
Walter S. James	Patchogue, L. I.	Patchogue to Port Jefferson, L. I.
Joseph De Mattais	Peekskill, N. Y.	Peekskill to State Military Camp
William A. Eaton		Port Washington to Mineola, L. I.
W. W. Lewis Transfer	Catawba, Va.	Roanoke to Catawba Sanitarium
I. W. Ogilshie	Dewey, Okla.	Dewey to Bartlesville, Okla.
Israel Weissberg	Trenton, N. J.	Trenton to Burlington, N. J.
Hymann Gordon	Trenton, N. J.	Trenton to Burlington, N. J.
Ingalls Motor Bus Line, Inc.		Olean to Fillmore, N. Y.
J. H. O'Driscoll	Park City, Utah	Park City to Kamas, Utah
Walber K. Johnston	Payson, Utah	Payson to Eureka, Utah
Little Bus Co.	Keansburg, N. J.	Keansburg to Keyport, N. J.
William A. Waite	North Bergen, N. J.	North Bergen to Union Hill, N. J.
Charles F. Schonleber	Jersey City, N. J.	
John G. Prin	Jersey City, N. J.	
Edward Wendt	Jersey City, N. J.	
John Cochran, Jr.	Jersey City, N. J.	
William C. Sexton	Jersey City, N. J.	
Margaret Halfin	Jersey City, N. J.	
Joseph Sorbo	Jersey City, N. J.	
Henry Hahurst, Sr.	Jersey City, N. J.	
Dominick Gentile	Jersey City, N. J.	
Isaac Weiner	Jersey City, N. J.	
Chris Gizek	Jersey City, N. J.	
George Perre	Jersey City, N. J.	
William Gerts	Jersey City, N. J.	
Joseph Drugas	Newark, N. J.	
Frank Dulkan	Newark, N. J.	
Benjamin Eagle	Newark, N. J.	
Louis Goetzle	Newark, N. J.	
William Harper	Newark, N. J.	
Herbert Hissam	Newark, N. J.	
John Holtkamp	Newark, N. J.	
Oscar Johnson	Newark, N. J.	
J. R. Nelson & B. J. Brown	Newark, N. J.	
Frederick Peter	Newark, N. J.	
Thomas Rivell	Newark, N. J.	
Robert Schnable	Newark, N. J.	
Morris Schwartz	Newark, N. J.	
George Trench	Newark, N. J.	
Weequahic Bus Co., Inc.	Newark, N. J.	
Tony Tumbara	Newark, N. J.	
Paul Tarnowsky	Newark, N. J.	
John Tahn	Newark, N. J.	
Incorporations		
Dovey-Coleman Transportation Co.		Vicksburg, Miss.
Schenectady Rapid Transit Co., Inc.		Schenectady, N. Y.
Summer Avenue Bus Company		Newark, N. J.
Newark-Ampere Bus Company		Newark, N. J.
Newark and Bloomfield Bus Company		Newark, N. J.
Newark and West Orange Bus Company		Newark, N. J.
South Orange Avenue Bus Company		Newark, N. J.
Lyons Farms Bus Company, Inc.		Newark, N. J.
Newark-Elizabeth Bus Company		Newark, N. J.
Clinton Avenue Bus Company		Newark, N. J.
Roseville Bus Company, Inc.		Newark, N. J.
Lyons Avenue Bus Company, Inc.		Newark, N. J.
Springfield Avenue Bus Company		Newark, N. J.
North Newark Bus Company		Newark, N. J.
Shore Line Bus Company		Newark, N. J.
Fairlawn Transportation Company		Paterson, N. J.
M. and M. Bus Line		Camden, N. J.
Newark-Jersey City Bus Company		Kearney, N. J.
Fairview Bus Association		Camden, N. J.
Hood Motor Bus Line		Metropolis, Ill.
Rock Island-Albion Motor Bus Company		Rock Island, Ill.
Kaukahee, Joliet & Pontiac Line		Kaukahee, Ill.
Pat Bus Company		Newark, N. J.
Camden Suburban Coach Co.		Camden, N. J.
Fairview Bus Association		Camden, N. J.
Union County Bus Company		Union Township, N. J.
Galva Bus Company		Galva, Ill.
Reliance Stage Co., Inc.		51 Chambers St., N. Y.
Peoria White Star Motor Bus Company		Peoria, Ill.
Georgetown-Park Lane-Cherrydale Motor Line	Clarendon, Va.	Washington Country Club to Georgetown, Va.

## Financial Section

### Revenues Increase on Railway Bus Lines

Substantial increases in the operating revenues of the bus lines owned by the United Electric Railways, Providence, R. I., are indicated in the financial statement issued recently by the company covering the seven months ended July 31, 1923.

Passenger revenue during the period increased \$28,847.30 over the figures for the preceeding seven months, July 3 to Dec. 31, 1922. The net income from Dec. 31 to July 31, 1923, increased \$10,489.55 as compared with the net income for July 3 to Dec. 31, 1922.

The United Electric Railways installed buses as a part of the transportation system of Providence and vicinity on July 3, 1922. Four lines were put into operation then, and a fifth was added the following October. Twenty-seven buses are operated by the company.

The financial statement of the company's bus lines follows:

Bus Statement, United Electric Railways

	July, 1923	July, 1922	July 31, 1923	Per Bus-Mile Seven Months Ended July 31, 1923
<b>Operating Revenues</b>				
101-A Passenger revenue—bus operation	\$21,848.03	\$11,608.15	\$97,592.85	22.06 cents
110-A Other revenue	108.34	108.34	512.36	11
Total revenue from transportation	\$21,956.37	\$11,716.49	\$98,105.21	17
<b>Operating Expenses</b>				
12-A Removal of snow and ice			24.65	
24-A Buildings, fixtures and grounds	2.95	2.95	32.49	.01
Total way and structures	\$2.95	\$2.95	\$57.14	.01
29-A Superintending bus equipment	474.34	450.35	2,738.85	.62
37-A Shop expenses, bus department	122.62	122.62	597.45	.14
38-A Repairs to motor	1,859.30	665.82	13,429.35	3.03
38-B Repairs to chassis	1,206.05	941.37	7,989.14	1.81
38-C Repairs to body	123.32	122.61	1,859.08	.42
38-D Tire repairs and renewals	547.22	545.47	4,244.00	.96
38-E Miscellaneous bus maintenance	113.79	102.19	2,227.22	.50
40-A Depreciation of buses	2,885.75	2,012.02	14,808.90	3.35
Total maintenance of equipment	\$7,332.42	\$4,962.45	\$47,894.89	10.83 cents
63-A Superintending bus operation	981.06	947.71	4,625.93	1.05
78-A Operators wages	5,469.12	2,154.97	27,931.28	6.31
78-B Garage employees	467.53	475.38	2,672.34	.60
78-C Garage expenses		50.00	36.79	.01
78-D Gasoline	2,917.50	800.00	16,467.81	3.72
78-E Lubricating oils and greases	259.07	14.08	1,129.35	.26
78-F Miscellaneous bus transportation exp.	1,133.79	594.47	4,781.30	1.08
Total cond. transportation	\$11,248.07	\$4,736.76	\$57,644.80	13.03 cents
80-A Advertising buses	\$176.50	\$73.98	\$579.79	.13
84-A Salaries and expenses gen. office clerks	257.43	248.33	390.28	.09
86-A Law expenses		17.07	52.64	.01
89-A Miscellaneous general expenses	126.27	126.27	263.17	.06
92-A Injuries and damages	715.58	303.98	3,184.75	.72
93-A Insurance	40.87	31.32	244.41	.06
94-A Stationery and printing	203.94	201.30	357.30	.08
95-A Store expense	20.96	20.96	437.93	.09
98-A Rent of equipment		710.00		
Total traffic and general miscellaneous	\$1,539.55	\$281.34	\$5,510.27	1.24 cents
Total operating expenses	\$20,122.09	\$9,984.50	\$111,107.10	25.11
Net operating revenue	\$1,833.38	\$1,732.99	\$1,067.89	.24
<b>Taxes</b>				
Net income	102.29	\$7.89	636.09	.14
	1,731.09	1,770.88	15,677.98	3.65
<b>Miscellaneous Statistics</b>				
Operating ratio (per cent.)	91.65%	77.97%	113.25%	
Average passenger revenue per day	\$704.78	\$351.68	\$460.34	
Revenue mileage	86,590.00	33,578.00	442,459.00	
Revenue passengers carried	278,982.00	119,690.00	1,245,709.00	
Gallons gasoline consumed	14,520.00	6,569.00	78,302.00	
Miles per gallon gasoline	5.96	7.1	5.65	
Gasoline cost per mile per gallon	3.37	.63	3.72	

### Bus Blamed by Illinois Railway for Revenue Decrease

Decreased revenue as a result of motor bus and automobile competition is given as the reason for the petition recently presented to the Illinois Commerce Commission by the Aurora, Plainfield & Joliet Railway asking permission to abandon the company's electric railway between Joliet and Aurora on the ground that it can no longer be operated at a profit.

First operated in 1901, the line is said to have shown annual profits until 1911, when dividends were suspended and strenuous efforts were required to keep from operating at a loss. As the deficit kept increasing with each succeeding year, the stockholders finally decided that it was useless to carry on the fight any longer. Vice-President James H. Winston stated that the petition for suspension was filed on the basis of a Supreme Court decision which held that no company can be compelled to operate a business at a loss. He expressed the hope that the abandonment of the road could take place within ninety days. Three years ago, he said, the road earned \$118,000 a year. The past year the total dwindled to \$100,000. To increase patronage the company financed an amuse-

ment park along the line, while the resort itself was a money maker, the public went to the park to hire and automobile and let it patronize the trolley car at all.

It is estimated by officials of the railway company that the road will bring about \$150,000 a year. The amusement park will bring perhaps half as much more, it is said. The road has \$250,000 worth of bonds which must be paid, most of them being owned at Joliet. It is expected that the bond and stock holder will be able to realize perhaps 50 per cent on a dollar of their original investment.

### Weekly Passes Withdrawn

The abuse of the weekly passes recently installed on the bus lines of the Richmond Rapid Transit Company, Richmond, Va., has caused the withdrawal of the passes and the institution of a new fare plan, according to a recent announcement of Gilbert K. Poole, an official of the system.

The passes were sold for \$1 a week and were used extensively. Patronage grew so much quicker than gross earnings that an investigation was started and it was found that several abuses were in vogue. The busmen, when returning home in the evening would give their passes to their sons, who would go and ride on the buses for amusement until late in the evening. It was found that this practice crowded the buses with children at night to the exclusion of the regular patronage.

Another abuse which was prevalent was the habit of a commuter dropping his pass from the window one block after boarding the car. A friend standing on the curb would pick up the pass and use it for himself. This practice was discovered by the police and in several instances was prevented by them.

In place of the weekly pass the Richmond Rapid Transit Company has substituted a fare of seven tokens for 50 cents. The token system is working well at the present time and the returns are gratifying, according to officials of the company.

### Grand Trunk Trains Lose to Buses

The bus and automobile are playing havoc with passenger traffic on many railroad lines, according to A. B. Brown, general passenger agent of the Grand Trunk and Canadian National Railways.

Some trains have lost as much as 80 per cent of their passengers to the buses, Mr. Brown said recently. He declared that the cost of operation remained the same, so that each train involved material losses.

"Such trains cannot be taken off," said Mr. Brown, "because the government commissioners will not permit this reduction of service, even when traffic has almost disappeared."

It will not be possible to cut passenger rates, Mr. Brown maintained, as long as this conditions prevail. He

said that the commercial traveler is using the bus and auto more and more, because he can thereby cover more territory in less time, while the bus is also taking more purely pleasure passenger traffic.

### Washington Rapid Transit Withdraws Bus Line

The Rhode Island Avenue bus line of the Washington (D. C.) Rapid Transit Company was abandoned at midnight on Saturday, Sept. 15.

In a letter of notification to the Public Utilities Commission H. H. England, manager of the company, said:

The company has done all in its power under existing law to avoid this action and regrets that through no fault of its own it is compelled to deprive the public of a service of undoubted benefit to a large number of persons and considerable section of the city.

The company notes with satisfaction that further consideration will be given by the commission as to the proper treatment of charges for repairs and replacements and also to the question of an increased rate of fare at the end of the present calendar year.

### Would Remove Tolls on Mississippi Bridges

Bus owners operating into Iowa territory from Illinois and Wisconsin are back of a movement for the removal of toll from bridges crossing the Mississippi River. While some buses enjoy a special rate, others pay a flat charge for the vehicle and each passenger, it is said.

Motorists must pay 25 cents a car and 5 cents for passengers other than the driver for round-trip tickets over the Iowa-Illinois bridge, while a rate of 30 cents per car and 5 cents a passenger is charged for the Wisconsin-Iowa tollbridge. In Lone Rock a toll charge is made in going to Muscoda over the Wisconsin River. A similar charge obtains at the La Crosse, Wis., bridge over the Mississippi. At Prairie du Chien, Wis., ferries charge a flat rate of \$1 per car in transporting machines to and from McGregor on the Mississippi.

The plan is to have tollbridges in states taken over by the state highway commission, while it is proposed that the Federal government purchase the Mississippi river bridges under army appropriation for military transcontinental highways.

Surveys have been made by state highway commissions on structures crossing the Mississippi and if the Federal purchase cannot be accomplished it is probable that states will purchase the bridges and open them for free transportation, reports say.

**Seven-Cent Fare in Marietta, Ohio.**—Seven-cent fares on all buses operated by the Marietta Bus Company, Marietta, Ohio, went into effect Sept. 1. The 5-cent fare formerly prevailing has been effective since the installation of the bus system two years ago. The company declares that it was unable to maintain its equipment at the standard desired under the old fare.

## Bus Regulation



### State Decisions Conflict

Michigan Commission Ruling Directly  
Opposed to Decision Announced by  
the Maine Public Utilities Board

THE fact that a proposed motor bus line parallels the track of a steam railroad or electric railway need not be taken into consideration by the Michigan Public Utilities Commission in considering the application of such a motor bus line to operate in the state, according to a recent decision of the commission. This is directly opposed to the recent decision of the Maine Public Utilities Commission reported in BUS TRANSPORTATION last month.

Several bus lines in Michigan are affected by the commission's ruling. State, interurban and steam roads raised protests that several bus lines that would parallel their roads were unnecessary, at the time the new motor bus law, passed by the 1923 Legislature, giving the commission the power to regulate routes of buses, went into effect.

The specific case on which the commission ruled was the protest of the Grand Trunk System and the Rapid Railway System against the Wolverine Transit Company, which operates six buses between Detroit and Mount Clemens.

In the opinion handed down by the commission, written by Commissioner Sherman T. Handy, and signed by Commissioners W. W. Potter, Samuel Odell and Rolf Dunn, the state body ruled that the recent legislative act (No. 209) limits the consideration of the commission in determining whether a public convenience and necessity exists, and does not allow the commission to take into consideration the fact that the proposed line would parallel a steam railroad or electric railway line.

It is expected that the railroads which raised the protest against buses paralleling their lines will not let the matter rest with the commission's ruling, but will carry the controversy to the State Supreme Court.

### Pickwick Bus Permit Revoked in Oregon

The permit held by the Pickwick Stages, Inc., to operate in Oregon was revoked recently by the Public Service Commission of that state. The order, which became effective on Sept. 20 following an investigation of the company's stages by the commission, declares that the schedule maintained by the buses was too fast for safety.

The company has operated its stages between San Francisco and Portland and has maintained a two-day schedule between the two terminals. The Pickwick Stages, Inc., is the largest bus line operating in the West, it is said.

### Ohio Bus Law Enforcement Is Lagging

Insufficient Funds Provided for Carry-  
ing Out Provisions of Freeman-  
Collister Act.

OHIO'S regulation of the motor bus and truck business is not proceeding as smoothly as might be expected, according to reports from that state.

One of the principal reasons seems to be that the state emergency board has declined to make adequate appropriation for the new department created in the State Utilities Commission, under the Freeman-Collister bus act, and that no money is available for employment of inspectors. Such funds as have been provided are being used as salaries for department heads, for clerks and for office expenses.

The final day for filing bus line applications was set for Sept. 15. Although the responsible bus companies are said to have complied with the regulations before that day, many bus owners failed to do so. The date was then extended to Sept. 28.

Meanwhile, without the inspectors necessary to check up on violations, the commission finds itself powerless to correct them.

Another difficulty the commission faces concerns the liability insurance which the motor lines are required to carry under the law, in order to protect passengers.

Proposed forms of insurance policies submitted to it have been rejected by the commission and a new form of policy is being drafted by E. E. Corn, special counsel for the commission. Such forms as have been submitted by bus lines are held to be faulty, the chief objection being that they are written with the primary view of protecting the lines rather than the public.

In reply to the commission's objections on this score, it is declared that insurance companies may refuse to write policies on the lines desired by the commission and that the premiums which the motor transportation lines will have to pay would be exorbitant. To this the commission answers that since the insurance will amount to millions of dollars the insurance companies will compete for this business.

The delay in getting the law into effect is losing the state a large sum in anticipated revenue, it is said. When the law was enacted, officials estimated that approximately \$1,500,000 would be paid into the state treasury's highway maintenance and repair fund. The total will, of course, be greatly reduced without adequate enforcement.

### Schenectady Jitney Men Fined

Another Supreme Court Justice of New York has been drawn into the Schenectady jitney tangle. Justice Craspe, sitting in a special term, recently imposed a jail sentence of fifteen days on five jitney operators guilty of operating in Schenectady in the face of a restraining injunction, and fined

three others in amounts ranging from \$50 to \$250.

Justice Craspe is the fourth Supreme Court Justice in the judicial district to be drawn into the jitney controversy. He has signified by his attitude that there will be no further toleration on his part. "There have been enough mistakes in this case already," he said. "It is no longer a question of court authority, it is now resolved into a question as to whether or not an injunction order of the Supreme Court is to be obeyed. An order of the Supreme Court must be obeyed or there will be no government."

The Schenectady Railway Company will continue its campaign against jitney operators, it is indicated, and violators of the injunction are being brought into court as soon as possible.

### Double-Deck Buses Barred from Louisville Parkways

Double-deck buses of the Kentucky-Carriers, Inc., will not be permitted on the parkways of Louisville, Ky., it was decided at a meeting of the city park board on Sept. 18.

The question arose on a request for a permit from the company with the announcement that the vehicles would soon arrive. The buses weigh 23,000 lb. This weight and the fact that they require a 20-ft. clearance moved the commissioners in their refusal, it is said. It was decided to permit the present single-deckers to remain on the parkways until it was demonstrated that their operation would ruin the roads.

Commissioner Carrell said that he believes the public wants the present service continued, and that it must be demonstrated to citizens that the road will be broken up by the buses before they will sanction ordering the vehicles off the parkways.

Following the action of the park board, James P. Barnes, president of the Kentucky Carriers, Inc., announced that double-deck bus service for Louisville would not be attempted at present but that the company would try to solve the problem without circumventing the board.

### Indianapolis Would Control Speed of Buses

An ordinance requiring all buses and trucks operating in Indianapolis, Ind., to be equipped with governors or controllers that would minimize their speed in the city streets was introduced at a recent meeting of the City Council.

The ordinance would also place a city license fee on all buses operating from the Indianapolis bus terminal, and increase the city license fee for all buses and trucks operating within the city limits. The ordinance is said to be the result of agitation on the part of residents of the city who claimed that the buses and trucks were destroying the pavements and operating at an excessive speed.

## Bus Replaces Trolley

Franchise Granted as Railway Obtains Permit for Abandonment of Elmira-Watkins, N. Y., Route.

SIMULTANEOUSLY with the granting of a permit by the Public Service Commission of New York, Sept. 21, for the abandonment of the Elmira-Watkins line of the Elmira Water, Light & Railroad Company, a franchise was issued to William Marshall for the operation of a motor bus over the same route.

The two orders followed hearings recently held by Commissioner James A. Parsons, whose investigation revealed the fact that the trolley line the Seneca Lake division had not paid operating expenses, including depreciation, for many years.

There was no opposition to the plan of abandonment. All the people present at the hearings seemed to agree that it would be a good thing. The proposed bus line would give much more satisfactory service, they said.

Mr. Marshall's certificate provides for the operation of buses from the Hotel Langwell, Elmira, through Horseheads, Pine Valley, Millport and Montour Falls to Watkins. Provision is also made that "no local passengers shall be carried from one point to another on that part of the route between the terminal at Elmira and the northerly boundary of the city of Horseheads."

The commission ruled that the electric railway must keep in good repair that portion of the highways that it is now required to maintain as long as the tracks remain.

### Wisconsin Bus Line May Contest City Ruling

A veritable hornet's nest has been stirred up in Fond du Lac, Wis., following the refusal of the City Commission to permit the Packard DeLuxe Motor Bus Line, Inc., of Milwaukee, to operate its buses on the streets of this city. This refusal was followed by a request to the City Commission to reconsider its action, but this the commission at a later date declined to do informing the bus company at the same time that if any further action is taken in the matter it must be in the form of court action to determine the city's right to refuse the permit. This step will be taken on the initiative of the bus company, it is said. The City Commission refused to grant a license on the ground that there is no necessity for another bus line, while counsel for the bus line declared that the question is not one for the city but for the railroad commission to determine and that in granting a permit the existence of other services need not be considered.

Thomas Nimlos, Milwaukee, general manager of the newly-formed bus company, in commenting on the refusal, stated that the first legal step of the company would be to carry the matter

into the courts and that a writ of mandamus would be obtained against the city prohibiting it from interfering with the operation of the bus line. As the matter could be argued directly by the Railroad Commission before the Supreme Court, if necessary.

Mr. Nimlos stated that the bus line is in favor of the Wisconsin Motor Bus Line Company, a subsidiary of the Milwaukee Electric Railway & Light Company, which is now furnishing trolley coach service between Milwaukee and Fond du Lac.

### Court May Pass on California School Bus Law

The California State constitutional provision under twenty-one from operating school buses is now being tested in the courts, reports say. The law in question is stated in Section 63, Chapter 206 and provides that "It shall be unlawful for any person under the age of twenty-one years to operate a vehicle carrying passengers for hire. No person under twenty-one years, whether acting as an operator or chauffeur, or as either, shall drive a school bus containing passengers which is owned and operated by a school district."

Legal authorities have suggested that prohibiting persons under twenty-one years of age from operating a bus owned by a school district might violate that provision of the State Constitution which provides that "all laws of a general nature shall have a uniform operation."

In this connection it is cited that under Section 63 a bus owned by a school district must have a driver more than twenty-one years of age, while a privately owned bus may have a driver under that age.

Attorney General Webb of California gives it as his opinion that the legislature of the State was justified in the apparent assumption that in the great majority of cases buses operated for transporting children to school are owned by the school districts—that he would therefore hesitate to advise that the law is unconstitutional. However, in the final analysis, the attorney general adds, a court decision is necessary to establish the constitutionality of an act which is questioned.

### New York Bus Line Granted Extension

The Public Service Commission of New York State recently authorized the Utica-Old Forge Transportation Company, now operating between Utica and Old Forge, to extend its line to the Eagle Bay Hotel in Webb Township. The company's application for the extension was opposed by Philip Panella, who has proposed a bus line over this territory. Evidence before the commission showed that the Utica-Old Forge Company has been furnishing service and that it has sufficient equipment to operate over the extended route.

# Personal Notes

## Bus Claims Mr. Seely

**Former Electric Railway Executive Joins Staff of Yellow Coach Manufacturing Company**

THE Yellow Coach Manufacturing Company of Chicago recently announced that Garrett T. Seely had joined the company's forces as Western sales manager. Thus another electric railway executive has become identified with the automotive industry. Mr. Seely was formerly vice-president and general manager of the Pennsylvania-Ohio Electric Company and its sub-



G. T. Seely

sidaries—among them the Pennsylvania-Ohio Coach Lines, Inc.

Mr. Seely has always been convinced of the possibilities of the bus in the transportation field. His company was the first electric railway to supplement its system with buses to develop an interurban business. At that time, it was a striking thing to do, but Mr. Seely did it, and the results have proved the wisdom of his move.

His new position at Chicago affords him more of an opportunity than any strictly operating position with a single railway to use his wide knowledge of engineering and transportation. His activities will include the distribution, sale and installation of Yellow Coach Company products, and will extend to the analysis of conditions governing future bus installations.

Mr. Seely, was born in Oswego, Ohio, in 1876, and was graduated from the University of Illinois, class of 1899. His first position was with the Atchison, Topeka & Santa Fé Railroad. In 1900 and 1901 he was engaged in engineering work on track elevation in Chicago. For the next seven years he served as engineer of maintenance on the South Side

Elevated Railroad, Chicago and was subsequently advanced to the position of vice-president and general manager. When the four elevated railroads were consolidated as to operation and management in 1911, he was made assistant general manager of the entire system.

Mr. Seely later became vice-president and general manager of the Pennsylvania Ohio Electric Company, and in 1921 was elected president of the Youngstown Municipal Railway, a subsidiary of the Pennsylvania-Ohio Electric Company. During the war Mr. Seely rendered valuable service on the Transportation Committee of the U. S. Shipping Board.

Mr. Seely's appointment is evidence that the Yellow Coach Manufacturing Company intends rounding out its personnel so as to include the very best engineering, transportation, and selling ability. The company has already drawn to a considerable extent on the electric railway industry for transportation experts.

## Bus Equipment in Trenton in Charge of E. J. Peartree, Jr.

Edward J. Peartree, Jr., has been placed in charge of the work of taking care of the new automotive equipment of the Central Transportation Company, the motor bus subsidiary of the Trenton & Mercer County Traction Company, Trenton, N. J. This company has just begun the operation of buses. Its present fleet consists of five modern type buses, but it is anticipated that additional vehicles will be added with the opening up of new routes.

Young Mr. Peartree, as he is known among the men of the company, in order to distinguish him from his father, who is general manager of the railway, always had a bent for doing things with his hands. He puttered around automobiles even before he was graduated from the Central School at Troy, N. Y., where he was reared, and upon leaving school he became a machinist apprentice at the H. J. Hammitt Machine Works, Troy. Meanwhile, however, he did more and more automobile work on his own account, and the appeal being strong with him to enter the auto field he did so. In all he has been in the business six years as garage machinist and foreman, part of this time in charge of tests of the Mercer car during the administration of the Hares Motors. He knows what the average automobile is capable of doing in the matter of performance, and he sees to it that buses under his direction do in service all that may reasonably be expected of them.

## Chicago's Safety Expert

**"Safety Always" Slogan Originated by Chicago Motor Coach Company's New Claim Agent**

FRANK J. TOMCZACK is Chicago's safety expert. As such it is eminently fitting that he should be the claim agent for the Chicago Motor Coach Company. Safety and transportation go together—and Mr. Tomczack is seeing to it that, in Chicago, the two words are closely linked. He has made Chicago's transportation slogan "Safety always."

Mr. Tomczack brings to his position as claim agent not only a wide experience in the spreading of safety propaganda, but the fruits of many years' work in the legal departments of large business and transportation concerns.

During the four years previous to his present affiliation, he was superintendent of the Chicago claim department of the Zurick General Accident



F. F. Tomczack

& Liability Company. Previous to this he was for ten years assistant to the superintendent of the casualty department of the Aetna Life Insurance Company. Five years' service with the Chicago City Railway in its claims department has prepared him with the practical experience demanded of transportation men.

In these various positions he was constantly spreading propaganda for safety, and he came to know the most efficient methods for impressing the public with the "Safety always" idea. So when the Mayor of Chicago came to select a safety committee for the city last September—to devise ways and means for reducing street accidents, and to spread the message of safety—he appointed Mr. Tomczack to head the committee of eight distinguished citizens of the city.

Mr. Tomczack originated the safety lessons—brief dissertations on safety—which appear in the Chicago newspapers daily and which are read and followed by thousands of Chicagoans. These have lately been reprinted on slips of paper and distributed by the Auto Trade Association to garage



owners, who place them in the cars which come to their establishments.

"Few people realize the importance of safety campaigns," says Mr. Tomczak, speaking of his work on the Mayor's committee. "There is an annual fire loss in Chicago of \$6,000,000, and the city spends \$7,000,000 a year on prevention. There is an accident loss of \$53,000,000, and the city spends only \$5,000 on safety campaigns. More of an effort must be made to impress the people with the importance of 'safety always.'"

Mr. Tomczak is an alderman from

the Thirty-ninth Ward of the City. He has been prominent in various fraternal and charitable organizations and is president of the Casualty Adjusters Association of Chicago.

At an early age he graduated from a business school in Marquette, Mich., following which he completed a course in law in the La Salle Extension University. He has been a resident of Chicago for twenty-two years and has lived in the United States all his life, except for six weeks. He was born in Poland on March 17, 1822, and was brought to America six weeks later.

## Three to Thirteen Buses in a Year

Many Suggestions for Others in Story of One of Connecticut's Successful Bus Men—Why "White Collar" Men Must Come

THERE was once a celebrated newspaper editor who broadcasted the message, "Go West, young man, go West!" When Horace Greeley thundered and thrived, sixty years or more ago, this advice was good. But even then it was true, that opportunity may be found on the young man's doorstep, as well as further afield.

Opportunity is just what Frank H. Geer seized, with two fists and two brawny arms, some two years ago. In all modesty he admitted he had never had any schooling. And in practically the same breath, showed he could use one of the important principles of the higher learning, in this case, the science of mathematics.

A straight line is the shortest distance between two points, is the principle. To Mr. Geer this meant also, two points are best connected by a straight (bus) line. The two points, before Mr. Geer came along, were connected only by roundabout railroad routes, requiring an expensive, tedious journey on at least two different trains. About two years ago the straight line came into sight, when the state started a concrete highway that led almost directly from New London to Hartford.

Was this opportunity? Foolish question, Mr. Geer must have thought. For him it was the chance of a lifetime. There were difficulties, of course. Money and financial resources were needed, then high class equipment and service. A permit must be obtained from the state authorities, insistent upon the highest standards in their transportation facilities. Even while the highway was under construction Mr. Geer began to make his plans. He must have worked wisely, because the exclusive permit was given him out of a field of fourteen applicants. Other seeming difficulties melted away like the snow in the warm days of early spring.

Something of this Mr. Geer not long ago told one of the editors of BUS TRANSPORTATION. He was interrupted in his New London garage, where the boss and his garage foreman were busy discussing the overhaul of one of the fine twenty-five passenger buses.



F. H. Geer

"Well," he said, "this is the first breathing spell we've had. All summer we had to use every bus and now there seems to be a little let-up. But we'll get them again just as soon as it gets colder and the bad weather comes along."

With this rather cheerful view of life as a starting point, the editor ventured a simple question: how many buses were operated by the Connecticut Motor Transportation Company, for that is the imposing name of Mr. Geer's organization. Officially termed the superintendent he is practically the operating, and maintenance, as well as executive, authority.

"Thirteen in all. We started in the spring last year with three of those little Whites over there. It didn't take long to find out we must have more, and bigger jobs. In June we put on three Model 50 Whites. They were about the first to come East. Our business kept growing during the summer and so we got two more of the big Whites in August. And this spring we bought five more of the Model 50 Whites and started a line to Norwich."

But this wasn't the whole story. The rest of it shows why Mr. Geer has been so successful with his bus business. The five new buses were due for delivery the first of June. On that day no buses. This was repeated until June 11, when, like the pre-olig days, with one difference. It was then that Mr. Geer set out for Cleveland, where both chassis and bodies were being built. Mr. Geer had little to say, as to just what happened in the next two weeks. On June 25, however, he got the five buses, taking delivery in Cleveland and saying, "With himself at the wheel of one vehicle, the new owner then started overland for Connecticut. The bus was taking no chances of freight or any other delay."

Buck of Mr. Geer's present duties is an extended experience in serving the public. He was a railroad fireman and engineer, and later a member of the New London police force. Between times he drove a White truck for the local Standard Oil traffic. Here, he says, was formed the high regard that has led to the standardization on the one make of chassis for the bus system. As additional training in the automotive fundamentals, Mr. Geer owned and superintended the operation of a taxi line in his native city.

In many ways this man has set an example it will pay bus men to follow. In the first place he is out to create traffic. Necessity riders are taken good care of but there are others. On the back of his attractive timetable is an appeal to pleasure riders. It is repeated here as a model, short, to the point, but full of meat:

From Hartford, Capital City, State noted for its beautiful lakes, charming home, wonderful State and National Banking and Insurance Companies, the high forty-five miles of fast driving roads, and village landscapes over a new concrete highway to:

New London, by the Sea, with its famed ocean breezes, deepwater bathing, boating and fishing, the summer life of social gaiety, its naval and military bases and its wealth of scenic and historic interests, the same with the perfect service offers many attractive features.

Connecting at the ferry through the picturesque country scenery to New York City, City of Homes, and the Bay of New England.

Considering the convenience and attractiveness of the service given, Mr. Geer has done well to establish a fair price for his efforts. The fare for the 45-mile trip is \$2, or about 5 cents a mile. The lowest fare is 25 cents. Are the public satisfied? It certainly looks so. The increase in number of buses has been mentioned. As many as 18,000 passengers were carried in one month the past summer. Compare this with the 25,000 total for the four summer months of 1922. And about two-thirds of the traffic is of the through variety.

The public he pleased, as Mr. Geer's motto. He didn't say this. He didn't have it plastered on the wall anywhere. But he is practicing it, which is more important. He is proud of his drivers' record of 100 per cent safe operation, and of their success in sticking to schedule even under snow conditions. For the public, which is largely of the traveler type with suitcases and bags,

he has placed only twenty-one seats in a twenty-five-passenger body. The space thus gained is used for a rear baggage compartment, leaving the interior free for passengers.

"See this socket here side of the hood," Mr. Geer explained. "We carry a green flag here to show people that a bus is following to take them. In the rush season we often fill one or more buses with through passengers. This carries an 'Express' sign and makes no local stops. But every such bus is followed by one marked 'Local' that picks up all the local business."

Running a successful bus system is a "white-collar" job, Mr. Geer believes. The man in charge must not be tied up to any detail of the work. Freedom is essential, to get out on the line, to watch things in the garage, or even to leave both for a few days or weeks, and know that things will keep going. Mr. Geer has personally studied conditions on many of the prominent bus lines of the East and Middle West. He has become acquainted with the men in charge. One of the early subscribers of BUS TRANSPORTATION, he uses its pages to keep up-to-date with what is going on in the industry at large.

On his own line Mr. Geer looks forward with quiet confidence to continued growth and usefulness. At present he is rebuilding his main garage in New London, where all major repairs and inspections are made. Opportunities for new routes are also being studied, with an eye to the future. Next summer an hourly schedule will probably be followed. Here is the finest kind of a picture of development. In 1922 a two-hour schedule, this year an hour and a half, with even closer headway probable next summer. Quantity production in bus service is almost a new thing. Mr. Geer early realized this and he has profited accordingly.

### Bernard Davidson Joins Chicago Motor Bus Company

Bernard Davidson, for twenty-one years a valued member of the auditing staff of the Interborough Rapid Transit Company, New York, N. Y., has become connected with the Chicago Motor Bus Company.

More than 100 associates in Auditor "Judge" E. F. J. Gaynor's office lured Mr. Davidson to a dinner at the Brevort, told intimate things about him, passed around the bouquets generally, and embarrassed him rather awfully before he was permitted to escape. The "Interborough Bulletin," published in the interest of the employees of the railway said that in his long service with the Interborough Mr. Davidson, by fine tact, sincere regard for the feelings of others and real "likeableness" made a lot of friends. The guest was told he was to dine with Mrs. Davidson and two friends. When he arrived he was hailed by the "gang." In his surprise he sat down in a place reserved for some

musician and had to be rescued and escorted to his place.

"Judge" Gaynor said friendly things about "Bert" and then gave him a platinum watch chain bought for him by his friends.

### From Anvil to Bus

Over Many a Rough and Bumpy Road Pioneer Bus Man Finally Reaches Goal

IT MAY seem a far call and a long jump from a place beside a blacksmith's anvil to that of directing head of a modern bus transportation concern. But George L. Seidelman, president of the Houston-Galveston (Tex.) Transportation Company, heard the call and made the jump. In fact, there were several calls and several jumps. In his own words, he "came into the bus business over a rough road."

That is true both literally and figuratively. The first three years of his



G. L. Seidelman

efforts to maintain a bus line comprised a fight against bad roads. The figurative part of it all comes from the several reverses that attended the efforts of this sturdy blacksmith, who finally landed safe on the profit side of bus transportation.

Ten years ago Mr. Seidelman decided to get away from blacksmithing. He was then foreman of the blacksmith shop of one of the large manufacturing concerns of San Francisco. He had a small sum of money. First he went into the ambulance business in California. But this venture was not successful. The ability of his competitors to operate on a scant profit and their expert knowledge of the business proved a combination the new man could not master. At that time jitneys were coming into prominence on the Pacific Coast.

So Mr. Seidelman saved what he could from his ambulance venture and essayed the jitney business. That proved profitable in a small way, but the way was so small that he could not conceive of it as a permanent venture. It did not promise sufficient return.

But jitney operation had done one thing—it had turned Mr. Seidelman in a direction that led to the bus business. He thought over the possibilities for a stage line operating with motor vehicles over California roads. Again he sold his holdings and started in on a new venture.

This time it required months of waiting to get a start. He made application to operate a bus line in San Francisco and Santa Cruse, Cal., and then waited thirteen months for his franchise to be granted.

But that wait was of little significance compared with the one that followed. For three years he operated that bus line over 27 miles of mountain roads, while he waited for the roads to be improved. Only a little paving was done during that time and he was compelled to route his buses over detours. This was a difficult period for Mr. Seidelman. New buses put on the line with the granting of the franchise were discarded ten months later due to heavy losses.

Still Mr. Seidelman held on. He knew a paved road would transfer figures to the proper side of the ledger. After three years, the paved road came to his rescue and there followed another three years of comparatively profitable operation. His business grew until it attracted the attention of others and he sold his equipment at a profit, even considering his thirteen months of waiting for a franchise and his three years of operation over mountain roads.

Then Mr. Seidelman decided to retrace his steps. This time he started from San Francisco to Galveston, but he took four modern buses with him, representing an investment of \$36,000. It was with this equipment that he began operation of the bus line between Houston and Galveston on May 1, 1922.

His line now operating is the most pretentious, and one of the most successful, bus ventures in Texas. But Mr. Seidelman considers it only the first step in bus transportation in the Lone Star State and he is making ready to add other lines to his system.

In the six years that the Texas bus operator has been in the business he has learned many things about bus transportation. But he sums them all up in few words. "Consider first the safety of your passengers—take extreme care for the safety of the public. Take care of your own equipment."

Care is his watchword. He declares that with proper care he can operate a bus line profitably and keep his equipment in such a condition that it gives maximum service at a minimum of cost.

"I got into the bus game over a rough road," he says, "and all the rough spots were not on rough, unpaved roads

either. Many of the bumps came from my lack of knowledge of the bus business. But it is a business that will pay if attention and determination are applied to it."

### R. C. Dukes, Secretary-Treasurer Camden County Bus Association

R. C. Dukes is the secretary-treasurer of the Camden County Bus Association with offices in Camden, N. J. He was one of its organizers. It was not until the organization had been in existence some time, however, that he was elected to be one of its officers.

Mr. Dukes was one of the first men in Camden County to operate an auto in regular service for public hire. He got into the business unwittingly. He used his own car at first. The idea then occurred to him to go into the business as a business, and he and several associates purchased two Reo Speed Wagons and a Bethlehem and established services to Collingswood and Gloucester. He also helped to organize the Royal Transportation Company, but later sold his interest in the company. Against the advice of Mr. Dukes, it is said, the new owners expanded the service beyond the transportation possibilities of the territory served and it became necessary to liquidate the company.

There were only six cars in service in Camden when the Camden County Bus Association was organized, and Mr. Dukes, as noted previously, took an active part in the affairs of the association from its inception. The association now numbers many members. It will readily be seen from this that Mr. Dukes is kept fairly busy looking after all the details that have to do with the pooling arrangement, the issuance of tickets, etc., from the headquarters of the association on upper Market Street. Despite all this he finds time for other things. For twelve years now he has been in the coal and ice business for himself in Camden, and this activity he still carries on. He has been in the bus business since 1919.

The record of passengers carried in Camden, published elsewhere in this issue, furnished a good criterion of the work of the bus association in looking after the interests of its members. The cash fare on the bus in Camden is 7 cents, but eight tickets are sold for 50 cents. The sale of tickets in quantities has been a big factor in the success of the Camden buses. The extent to which this is true may, perhaps, be judged best by the fact that in one month, from Aug. 20 to Sept. 20, a total of 960,000 tickets was sold. This is, of course, in addition to the straight cash fare business. The work of accounting for all this business is done under the direction of Mr. Dukes.

John A. Ritchie, president of the Chicago Motor Coach Company, has been elected to the board of directors of the Yellow Cab Manufacturing Company, Chicago.

# Business Information

What is being bought and built, latest news from the factories and the field.



## American Motor Truck Creditors May Recover in Full

Acting on behalf of receiver for the R. L. Dollings Company, of whom the American Motor Truck Company was a subsidiary, suit was recently initiated by S. A. Kinear in the Ohio courts to recover from directors of the Dollings Company of Ohio, approximately \$130,000 which it is alleged was paid illegally as dividends on common stock from October, 1919, to April, 1923.

The American Motor Truck Company, one of the many Dollings subsidiaries, was declared bankrupt by the courts on July 18, 1923, and T. H. Spencer was appointed receiver. In a recent statement as to the condition of the bus building company, and plans for the future, Mr. Spencer said:

"When this company went into my hands as receiver I found orders for its product aggregating more than \$100,000. Some of this was for motor buses for which there is undoubtedly a strong present and future market. A careful detailed estimate of the cost of labor and materials to complete these twenty-three jobs is about \$35,655 and I believe that these trucks and buses can be disposed of readily for cash at a profit of more than \$30,000.

"The American Motor Truck Company has an equity in the paper held by the Fidelity & Casualty Company of approximately \$50,000. By the receiver's repossessing buses and trucks from delinquent purchasers and in some instances reconditioning them in order to effect a new sale, it is believed that this equity can be preserved for the creditors of the company."

The creditors at a recent meeting a-

greed Mr. Spencer stated that the assets of the company were estimated at \$130,000. The receiver's department is expected to have a profit on the sale of the assets. Mr. Spencer stated that he expects to be paid for the work done by the company carried through after the payment on a limited basis to complete some of the work in process.

The R. L. Dollings Company, against which the suit of Mr. Kinear is brought, with the International Note & Mortgage Company, professes to hold a claim against the American Motor Truck Company of \$29,450.21. Should the claim be held invalid by the court, the creditors of the motor truck company should realize 100 per cent on the dollar.

Mr. Kinear's suit against the Dollings Company of Ohio, a parent company, alleges that in October, 1919, a 7 per cent dividend was declared by the Dollings Company. From that time until April, 1923, quarterly dividends of 6.36 per cent were paid. In April a dividend of slightly more than 1 per cent was declared, and in addition an extra dividend was declared in 1921.

Mr. Kinear alleges that at the time each quarterly dividend was paid "there were not sufficient surplus profit arising from the Dollings Company to make and declare said dividends," and that they were paid "out of the capital of the company."

Defendants named in the proceedings are William E. Benham, President, Dwight Harrison, Vice President, Fred G. Connelly and John R. Wilbanks, Directors at the time receivership proceedings were instituted, and six executors of the Estate of Charles E. Morris.

The defendants named had 2560 shares of the 11,000 shares of the \$50 par value common stock outstanding on which dividends of approximately \$419,000 were said to have been paid.

## Gasoline Prices—Sept. 24, 1923

City	Gals. per Gal. Tank	Service Station
Albany, N. Y.	17	16
Atlanta, Ga.	17	20
Boston, Mass.	19.5	22
Chicago, Ill.	13.4	15.4
Detroit, Mich.	14.8	16.8
Fort Worth, Tex.	8	12
Indianapolis, Ind.	14.2	18.2
Jacksonville, Fla.	15	20
Kansas City, Mo.	12.9	15.9
Louisville, Ky.	16	19
Memphis, Tenn.	14	19
Milwaukee, Wis.	14	16
Mobile, Ala.	15	19
Newark, N. J.	18.5	20.5
New Haven, Conn.	19.5	23
New Orleans, La.	12.5	16.5
New York, N. Y.	15.5	22
Oklahoma City, Okla.	13	16
Omaha, Neb.	14.25	16.25
Philadelphia, Pa.	19	24
Pittsburgh, Pa.	19	24
Richmond, Va.	18	24
St. Louis, Mo.	13.8	16.3
St. Paul, Minn.	14.9	16.9
Salt Lake City, Utah	19.5	24
San Francisco, Cal.	11	14
Seattle, Wash.	12	16
Spokane, Wash.	15.5	19.5
Washington, D. C.	18	21

## Gasoline Prices Still on Decline

Continued decline in gasoline prices the nation over brought the average tank wagon price in thirty representative cities to a new low figure of 15.81 cents per gallon. This represents a decrease of 0.86 cent since Aug. 15, a decrease of 3.27 cents from the average price of 19.08 cents July 20, at the height of the summer season, and a total reduction of 5.39 cents from the high price of 1923.

Following the price war precipitated by Governor McMeister of South Dakota, prices were reduced in New York, New Jersey, Kentucky, Texas, Pennsylvania, Iowa, and two cents of 2 cents each were made by the Standard

Oil Company of California, bringing the price to 13 cents in southern California and 14 cents in San Francisco.

A saving to the consumer of 13.49 cents a gallon is indicated by the price prevalent on Sept. 15, compared with the 1921 high average price of 29.3 cents, or \$5.67 on a 42-gal. barrel. Applied to the consumption at the July rate—the height of the season, equals \$90,992,624 a month, or, roughly \$3,000,000 a day.

The season now approaching will, of course, bring on decreased consumption resulting in further additions to gasoline stocks, which declined from 1,165,389,340 gal. on July 31 to a little more than 1,000,000,000 gal. at the end of August.

### Victor Motors Announces Unique Dealer Contract

Victor Motors, Inc., a \$3,000,000 Missouri corporation recently formed to manufacture buses, trucks and taxicabs, has announced a new form of contract for the company's dealers.

The contract is said to differ widely from those heretofore in vogue in that the Victor company will not demand deposits from its dealers on their contracts, nor will it require a definite schedule of shipment on orders from dealers. The company will merely require that the dealer give an accurate estimate of his requirements without compelling him to take a specified schedule. Under this plan dealers will receive only such cars as they can advantageously handle, thereby eliminating the possibility of overstocking and the heavy expense incurred through an oversupply of unsold cars. The Victor contract is said to be the shortest dealer contract on record. The entire Victor organization is built around the dealer, whom the company regards as the backbone of the business.

### Tire Stocks Decreasing

Over-production of rubber tires is decreasing, according to officials of the tire industry, and although there will be no cut in retail prices in the near future there is at least no indication of a rise.

This prediction is sustained by the fact that the winter season now approaching is, of course, the period of least consumption, and competition becomes more keen both among the manufacturers and the retailer. A rise in price is considered unlikely during such a time.

During the month of September manufacturers produced only 50 per cent of their usual output, supplying the demand for tires in part from stocks already on hand.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has started the construction of a \$12,000 garage to accommodate buses operating in conjunction with its railway service.

### Blue Ridge Line to Co-operate with Railway

In an order issued recently, the Public Service Commission of Maryland granted permission for the Blue Ridge Transportation Company of Hagerstown to issue stock to the amount of \$115,000 and to exercise its franchise to operate motor bus lines between Baltimore and Hagerstown, Hagerstown and Cumberland and between Hagerstown and points in Virginia.

The new company has taken over the bus lines heretofore operated by E. V. Hull of Hagerstown, and which are said to have been more or less in competition with the Hagerstown-Frederick Electric Railway. Interested in the new company is the Potomac Public Service Company, which owns the stock of the Hagerstown-Frederick Railway. By formation of the new company with representatives of the Potomac Public Service Company on the board of directors, the operation of the bus lines and the electric road will be harmonized, it is said.

### U. S. Commerce Chamber to Call Transportation Conference

Authorities on transportation problems—railroad, motor and waterway—are holding a series of preliminary meetings under the auspices of the United States Chamber of Commerce in an attempt to formulate a program of recommended transportation development to be submitted to Congress and the executive branch of the government for their guidance. Secretary of Commerce Hoover has participated in several of these meetings. The relation of motor highway transport and the use of motor delivery in congested transportation terminals is one of the phases receiving serious study. Conclusions reached will first be submitted to a general transportation conference this fall before they are presented to the government.

### Rolling Stock

Red Star Bus Line, operating between New Lexington and Columbus, Ohio, has added a Studebaker car to its equipment.

L. G. Higgins, New Orleans, La., who operates several lines in that state, contemplates adding four more twenty-passenger buses for use on the route between New Orleans and Baton Rouge, La.

Martin C. Griffith, owner of the Middletown-Liberty, N. Y., Bus Line, recently put into operation a twenty-passenger bus equipped with a Graham chassis, Hoover body and Dodge engine. Mr. Griffin expects to add three other buses to his fleet in the near future.

Philadelphia Rapid Transit Company has ordered ten Z type double-deck buses from the Yellow Coach Manufacturing Company, Chicago.

Jefferson Highway Transportation Company, Little Falls, Minn., recently added a new bus to the fleet now running between Little Falls and Minneapolis, Minn.

Kentucky Carriers, Inc., operating in Louisville, Ky., recently ordered ten Z type double-deck buses from the Yellow Coach Manufacturing Company, Chicago, Ill.

Royal Blue Transportation Co., Greensboro, N. C., recently added a twenty-one-passenger White bus to its equipment. It will be placed in the High Point-Winston-Salem service.

Tri-City Railway of Illinois recently contracted with the White Company, Cleveland, for two twenty-five-passenger buses for use as feeders to the trolley line in Moline, Ill., and vicinity.

Michigan United Railway Lines, Lansing, which is operating eight Reo buses equipped with the Fitzjohn Model B-51, twenty-one-passenger bodies, recently placed an order for six additional units with the same equipment to run in Kalamazoo.

Rochester Railway Co-ordinated Bus Lines, Inc., a subsidiary of the New York State Railways, will soon receive five trackless trolley cars now being built by the Brockway Motor Truck Company, Cortland, N. Y. These cars will accommodate twenty-five passengers and have a 185-in wheelbase. The bodies are being constructed by the Kuhlman Car Company, with steel strength members and "Plymet" panels. They will be equipped with General Electric motors and contactor type control, Ohio Brass trolley bases and collectors.

Inter-City Terminal Railway, Little Rock, Ark., has purchased six sixteen-passenger Reo buses for use on the Third and Ninth Streets bus lines. Two of the buses were delivered on Aug. 9 and the others will be forwarded to Little Rock within the next month. The company plans to replace all its Ford buses, and will maintain a seven-minute schedule on both lines when all the Reos are in service. Three will be used on East Third Street and three on Ninth Street. The buses will operate from the city limits to Olive Street on Third Street and to Markham and Broadway.

### Garages and Shops

South Cumberland Garage, Cumberland, Md., a large two-story-and-a-half frame and sheet steel building, with six buses and several other smaller machines, was completely destroyed by fire of unknown origin recently. The loss to the Queen City Bus Company, Inc., is estimated at \$15,000. The garage building was valued at about \$4,000, with small insurance, it is said.

Madison, Wis., Union Bus Terminal is being erected by bus owners operating in and out of the city and will be completed some time this fall. Present plans call for a complete waiting room and ticket office. A strip of land has been purchased adjoining the station, which will be paved to serve as a parking place where buses may arrive and depart on trips throughout the state.

### Business Notes

National Railway Appliance Company, New York, announces that it has been appointed general sales agent for the Yellow Coach Manufacturing Company of Chicago.

Trautner Manufacturing Company, St. Paul, Minn., is a new incorporation, capitalized at \$50,000, which will make automobile accessories. Incorporators are: N. W. Trautner, M. E. Trautner and E. W. Buckley.

### Advertising Literature

Nicholas-Lintern Company, Cleveland, Ohio, has issued a bulletin descriptive of the "Superior Ventilation" system for buses.

The American Chemical Paint Company's new factory at Ambler, Pa., is rapidly nearing completion. The building, designed especially for the manufacture of A.C.P. rust removing and preventing chemicals, will be occupied about Nov. 1 of this year, according to present indications.

Vig-Tor Axle Company, Cleveland, Ohio, is distributing an interesting folder describing Vig-Tor axles with Vig-Tor safety service brake. Specifications of this new light-duty axle are given in detail and its unusual features noted.

Selden Truck Corporation, Rochester, N. Y., recently devoted an issue of its publication "Truck Transportation" to the subject of motor buses. It contains, among many interesting features, articles on bus operation in Springfield, Mass., by the Springfield Street Railway Company, and between Rochester and Pittsford, N. Y., by the East Avenue Bus Company. A double-page story entitled "Experiences on Four New York City Lines Prove Motor Buses a Success" includes a series of photographs showing the various types of buses in use on New York city lines.



# BUS TRANSPORTATION



New York, November, 1923

## How 200 Buses Are Put Under One Roof

*By Martin C. Schwab*

Architect and Consulting Engineering, Chicago, Ill.

THE first of the new garages under construction by the Chicago Motor Coach Company has been opened for operation. This building represents the consummation of extended study and research into garage structural design and illustrates many interesting developments through the application of high-grade modern types of industrial building construction to garage purposes. The building just completed is located on Cottage Grove Avenue at Fifty-second Street, in a convenient position to house the coaches operating on the inner portions of the company's south side routes on Drexel, Grand and Michigan Boulevards. Two other buildings similar in size, design and construction to the one just opened are to be constructed. One, located between Wilcox and Adams streets at Kenton Avenue, on the west side of the city, is now well under way, and a third unit is planned for the far south side to house the coaches operating on lines in that location.

### GENERAL FEATURES

In preparing plans for its garages, the company, through its president, John A. Ritchie, imposed certain general requirements which have been successfully met by the newly completed structure. These general requirements were as follows:

1. To construct a permanent building, insuring minimum maintenance expense and at the same time holding the total investment and cost of insurance as low as possible.
2. To provide the maximum possible amount of free floor space, unobstructed by interior structural members.
3. To develop the greatest possible use of natural lighting in the interior combined with good natural

The new daylight garage of the Chicago Motor Coach Company has 63,300 sq.ft. of coach storage space. A double butterfly roof supported on a center box truss gives minimum obstruction on the interior. Daylight interior illumination, sunshine and fresh air for improved working conditions are obtained from this unique design of roof by providing 28 per cent glass area. Centrifugal pumps, electrically operated, control the fuel and oil at the filling stations. Hot air is used for heating. A power-operated fan system insures proper heat distribution and ventilation. A carefully designed arrangement for washing coaches is provided.

ventilation so as to provide a healthy and comfortable workshop, which it was believed would encourage speed and efficiency in the inspection and repair of coaches.

4. To provide fuel and oil storage capacity of not less than 60,000 gal. and to arrange for the distribution of this fuel and oil to convenient filling stations designed for the rapid fueling of coaches with the minimum of confusion and lost time.
5. To include a complete and efficient heating system arranged to distribute the heat uniformly through the building and at the same time to keep the heat near the floor so that the engines may be kept warm and readily started in cold weather.
6. To install a ventilating system which would insure the rapid removal of poisonous gases and the maintenance of a healthy atmosphere for workmen.
7. To construct, along with the garage proper, the necessary coal storage, shop area, locker and wash rooms, together with instruction and recreational rooms for employees,

without sacrificing available garage space for coaches.

A study of the finished building shows that these primary requirements have been fulfilled in detail and that this garage represents a complete and modern structure for the housing, fueling, inspection and repair of passenger coaches, together with the necessary quarters for administrative offices and accommodations for operating crews. Its compactness and economy in the utilization of space represents the outstanding accomplishments in the design.

### AMPLE ACCOMMODATIONS FOR OPERATING CREWS

The building has a frontage of 298 ft. on Cottage Grove Avenue and 211 ft. on Fifty-second Street. Located in a semi-residential section immediately facing Washington Park, the structure harmonizes with its surroundings. It has a faced brick exterior of simple design with white limestone trimming. The total ground area occupied by the garage and administration buildings is 68,297 sq.ft. The total floor area of the entire structure is 83,795 sq.ft., of which 63,300 sq.ft. is actual garage floor space. This, therefore, allows 20,495 sq.ft. for power plant, administrative and recreational purposes, which is approximately 32 per cent of the garage area, and illustrates strikingly the far-sighted policy which has been adopted of providing ample quarters for the welfare and comfort of employees.

The garage has ample capacity to handle approximately 200 buses, together with the necessary service and emergency equipment. This will consist of four sand shakers for distributing sand on icy boulevards in winter, one emergency truck, six snowplows and necessary service

cars for the use of operating officials.

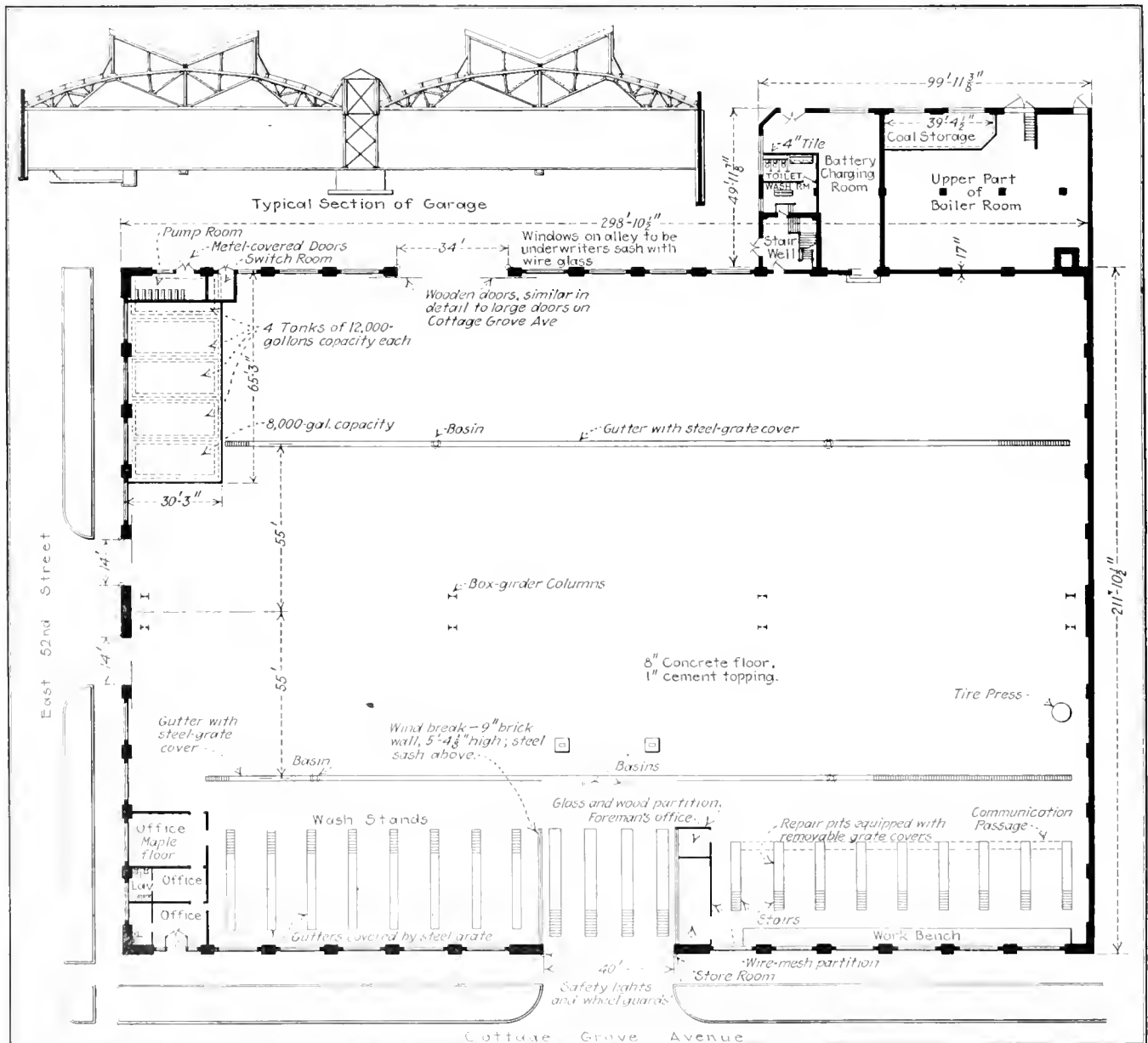
The roof of the building is supported at the center on a box truss which is carried on four pairs of columns. One pair of columns is erected near the end wall and the two intermediate pairs are spaced on 95-ft. centers and represent the only obstructions in the entire garage floor area. The ends of the butterfly roof trusses are supported on the

tion represents a notable advance in providing daylight illumination in garage design. A glass area equivalent to 28 per cent of the garage floor area is obtained and chain-operated sash allow plenty of natural ventilation.

The concrete floor rests upon a sand foundation and is especially designed to resist the impact stresses set up by moving coaches. An elaborate system of drainage

trenches are covered with removable gratings which are made amply strong to carry the weight of coaches or service trucks. A large number of specially designed traps are installed to prevent oil, grease and debris from entering the sewerage service pipes.

Special attention has been given to the heating, ventilating and lighting installation, both to insure comfort and healthful conditions for



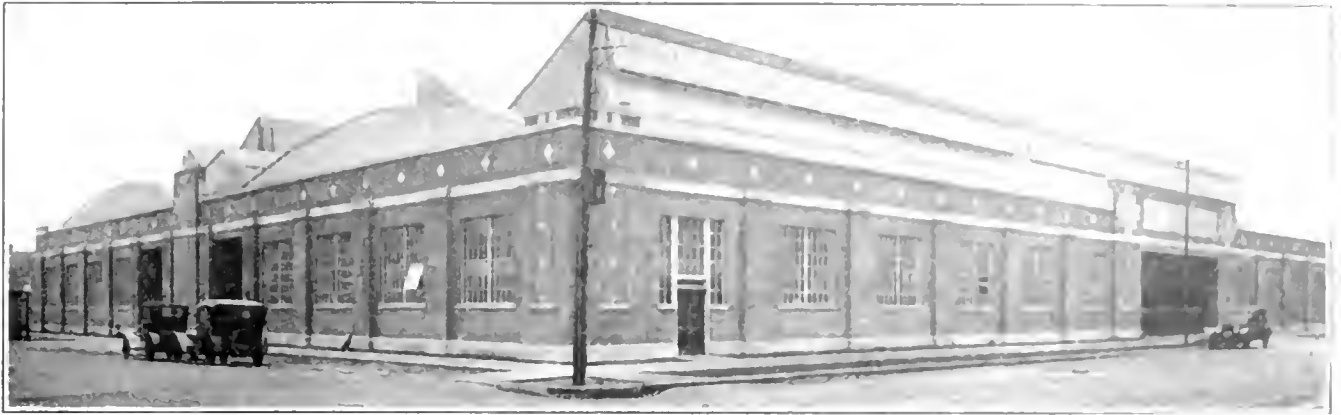
front and rear brick wall piers and upon the center box truss. They have a span of 100 ft. 6 in. and are spaced on 19-ft. centers. Headroom of 17 ft. under the roof trusses allows ample clearance for demounting double-deck bus bodies and also allows for the operation of buses equipped with covered top decks, which is a further development the management has under consideration. The double butterfly construc-

*Floor plan of new Chicago Motor Coach garage shows general arrangement together with location of drainage gutters and inspection pits. The inset in the upper left-hand corner shows the roof construction, which is of a type generally applied to high grade industrial buildings*

trenches is installed to facilitate washing and cleaning of both the coaches and the garage floor. These

employees, and also to increase efficiency and facilitate the starting of engines in cold weather. The boiler room is located in the basement of the administration building. One high-pressure boiler of 200 rated boiler horsepower is installed and is equipped with a forced-draft fan to give a 100 per cent overload capacity. A concrete coal storage bin with a capacity of 150 tons can be filled directly from trucks in the





rear alley. By a steam-driven blower fan the heat is distributed from the steam coils to underground concrete heating and ventilating passages. A system of dampers is so arranged that air for the heating system may be either recirculated from the garage or may be drawn directly from the outside atmosphere. For regulation of the steam in the heating coils a thermostat system is included.

The administration building is heated by direct radiation. Both the direct and indirect heating systems are operated under vacuum through the use of a vacuum pump. The exhaust steam from the fan engine is utilized in the heating coils so as to give maximum operating economy. An auxiliary electric motor drive is also provided on the ventilating fan to take care of emergencies and to make the fan available in the summer.

The heating and ventilating ducts under the garage floor are built of ample dimensions to insure free air circulation and are designed to carry the weight of coaches with a liberal margin of safety. The warm air is conducted directly to grill openings

*A simple and pleasing exterior harmonizes with the surroundings in a semi-residential neighborhood*

in the concrete floor which are spaced to give uniform distribution of heat. This method of introducing the warm air directly at the floor provides a satisfactory system from the standpoint of comfort of workmen and also permits the coaches to be properly warmed before going into service.

#### FIRE PROTECTION

The entire garage and administration building are protected with a sprinkler system supplied by a 75,000-gal. capacity tank mounted on a steel tower and supported on the roof of the administration building. The portion of the system in the garage proper is of the dry pipe type, in which compressed air instead of water is contained in the piping at the sprinkler heads. This arrangement is a safeguard against freezing of the sprinkler pipes. The sprinklers in the administration building are of the customary "wet-pipe" type.

Several door openings are provided to facilitate the movement of buses and also to provide for emergencies such as fire. The center service opening at the front of the garage is 10 ft. wide and is closed by two easily operated sliding doors

carried on a 7 in. overhead channel track. This opening is wide enough to comfortably accommodate three coaches simultaneously and insures speed and safety in handling the vehicles in and out of the garage. A similar door 24 ft. wide is provided at the rear of the building as an emergency exit to the alley and two 14-ft. auxiliary doors open through the south wall into Fifty-second Street.

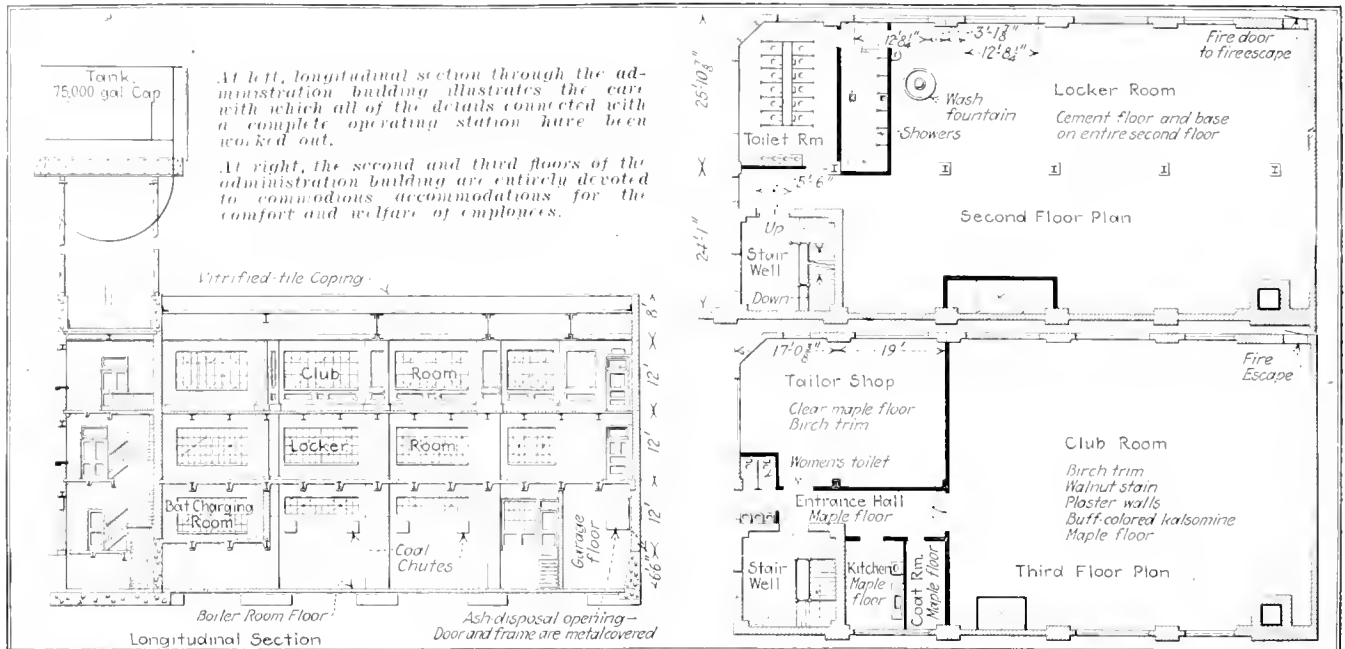
A very ingenious arrangement of specially designed safety lights is provided at the lower corners of the wall piers at the door openings. These lights form a combination wheel guard and safety marker. A large wind break constructed of steel and glass, the full height of the door opening, is installed on either side of the main front door to protect workmen from drafts when the doors are opened during the winter months.

A modern type of storeroom equipped with steel storage racks and inclosed with wire-mesh partitions is located in the corner back of

*Construction photograph of similar type of garage now building on the west side of city clarifies illustrates the type of roof design adopted*

*Exterior view of the building showing the entrance and the main front door. The space between the main door and the auxiliary doors is closed by two easily operated sliding doors.*





the wind break on the south side of the front doorway. Between the storeroom and the south wall of the building nine inspection pits are installed. Each pit is 25 ft. long, 4 ft. deep and 40 in. wide. They are heated and drained and are all connected at one end by a communicating passage under the floor. In addition, the pits are covered when not in use by steel grills similar to those used over the drainage trenches. These grills are also designed to safely carry the weight of a coach. Substantial workbenches are built along the wall of the building adjacent to the ends of the pits.

In the operation of the coach system it is planned to carry on at the garage all inspection and repair work with the exception of only major repairs or the annual general

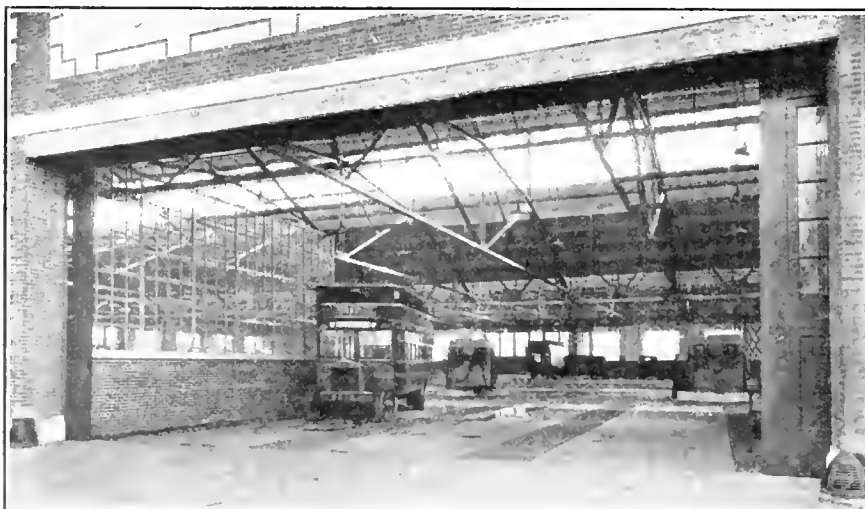
overhauls. The machine equipment will consist of one 400-ton hydraulic tire press, one radial drill press, a pair of emery wheels and an arbor press. An overhead crane system will be installed later to facilitate the handling of heavy parts.

#### FUEL AND OIL STORAGE

Ample fuel and oil storage capacity is provided by four underground tanks of 12,000 gal. capacity each for gasoline and one tank of 8,000 gal. capacity for oil. The gasoline tanks are filled from the outside of the building and the oil tanks from the interior. An indicator board mounted on the inside of the garage shows the amount of material in each tank. Vent pipes are connected to a common vertical riser which is run up through the roof of the building.

Automatically started Wayne pumps carry the gas and oil through pipes under the garage floor to four gas and oil filling stations located on the brick piers shown in the accompanying photograph immediately opposite the front main door. The pumps are located in a special pump room on the outside of the building and are automatically started from the filling station by throwing a control switch at the station. Each station has its own pump and a delivery rate of 25 gal. of gasoline per minute per station is obtained. Hot and cold water is also available at each of the filling stations. Two auxiliary gasoline outlets are to be installed on one of the main roof columns in the center of the building. The lubricating oil discharge pipes which are located on the same brick piers with the gasoline outlets are also provided with remote controlled discharge pumps and in addition are equipped with self-measuring meters to indicate the exact amount of oil delivered.

The gasoline storage and distribution system has been designed so as to avoid the necessity of any gasoline entering the building except in underground tanks or piping under the floor. In this particular structure it was not possible to install the storage tanks entirely underground because of the presence of lake water close to the surface in the sand foundation. For this reason, therefore, the tanks are set into concrete compartments which extend up above the floor in one corner of the garage. The space above this compartment will be utilized for spare tire storage.



View through driveway at front door shows wind break, filling stands and drainage gutters. Note safety markers at corners of wall piers and large space available at doorway

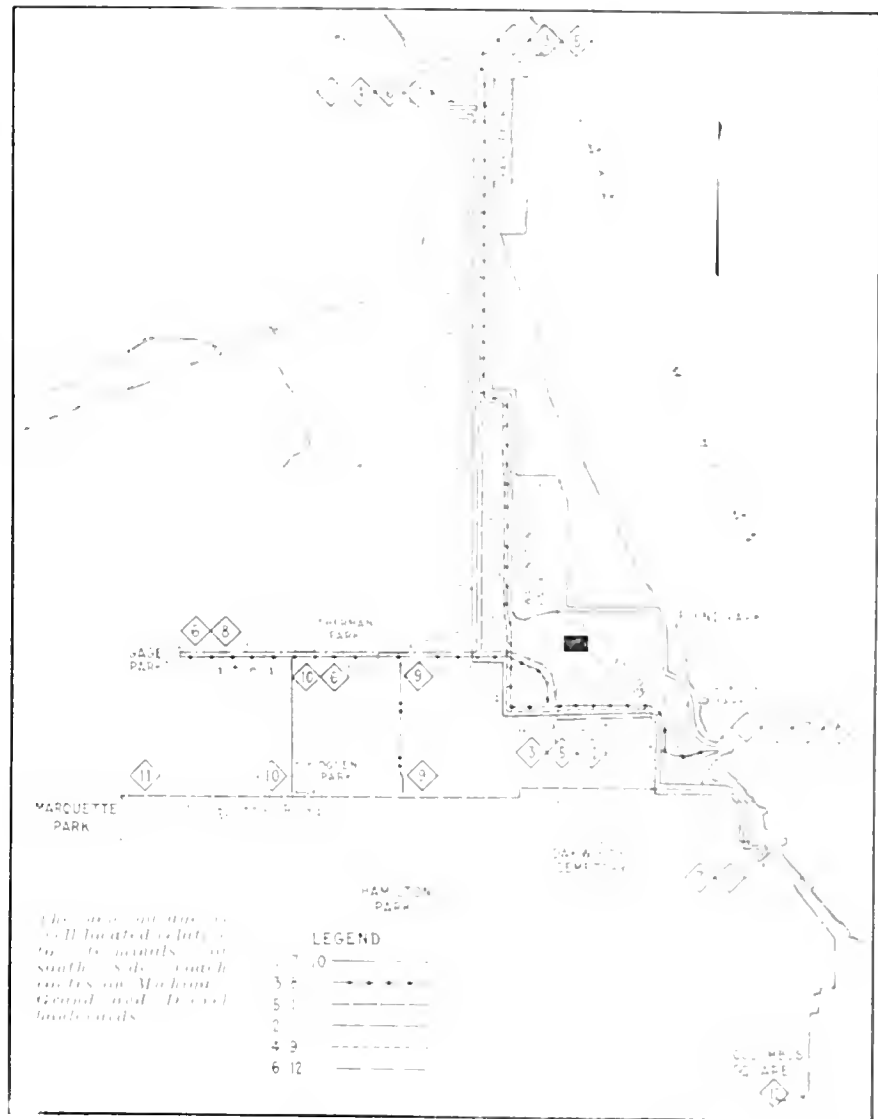
A completely equipped battery charging room is located on a mezzanine adjacent to the boiler room. Two additional 6,000-gal. capacity tanks are installed under the floor of this room. One will be used for gear oil and the other will be available as an auxiliary storage tank. These tanks are connected to pumps located on the mezzanine floor.

The company considers clean coaches a very important part of the program for properly merchandising transportation. With this point in view a very carefully designed system for regular washing has been installed. Water from the city mains is brought into a 300-gal. surge tank and is pumped from this to a 1,000-gal. pressure tank by means of a centrifugal pump which delivers water to the pressure tank at 125 lb. per square inch. Both hot and cold water are carried to wall and overhead outlets along a section at the front of the garage, between the center doorway and the north wall. Taps are brought out and connected to flexible hose suspended from overhead so that a hose is available on either side of each coach. This is in addition to the water taps along the wall. Mixing valves are provided so that water can be delivered at any desired temperature. In addition, the layout is so arranged that an overhead shower system can be utilized if this proves practicable. Ample drainage trenches spaced along this washing section carry off the water rapidly so as to give the best possible working conditions. Space is provided in this section to thoroughly wash seven coaches simultaneously.

In addition to the washing facilities just described the area between the wind breaks at the center doorway is liberally provided with overhead water taps and drainage trenches in the floor for the purpose of allowing coaches to be slushed off as they enter the garage on wet and muddy nights. Space is available for accommodating nine coaches in this area if necessary. The special hot-water heater for supplying water to the various outlets is designed to burn the débris which accumulates from the vehicles so as to reduce the cost of heating the water.

#### OFFICES AND TIME CLOCKS

Offices for the superintendent of transportation and for the superintendent of equipment are located on the garage floor in the corner of the



building at Cottage Grove Avenue and Fifty-second Street and have an independent doorway opening from a reception room directly into Cottage Grove Avenue. On a mezzanine above these offices is located the cashier's office and an inclosed space for use by conductors in balancing their accounts and settling up. A small office for the dispatcher is built on the garage floor between the two doors opening into Fifty-second Street.

A master clock in the superintendent's office controls a number of other clocks located at various points about the garage. One large double-face clock is mounted in the center of the garage and one is located on the outside at each doorway. A similar clock is provided on the mezzanine convenient for the men who are settling up accounts and one is also located inside the cashier's office. Still another clock is mounted in the dispatcher's office. The time clocks for use of mechan-

ics are all controlled from the master clock.

#### LOCKER AND RECREATION ROOMS

The second floor of the administration building is devoted to a well-equipped locker room. A large sanitary toilet is installed on this floor and communicates with a well-equipped shower bath room. A circular wash fountain in the locker room insures proper provision for sanitation.

A comfortable club or recreation room is located on the third floor and has dimensions of approximately 50 ft. square. This room is free of any obstructing columns and is arranged for use either for entertainment or instructional purposes. On this floor also is a tailor shop equipped with steam and gas. A kitchen, coat room and ladies' toilet are also provided, so that this floor may be used for a number of purposes in connection with welfare or educational work.

## Studies of Municipal Bus Operation

SIX of the largest North American cities operate municipal bus lines, according to a survey made by the Toledo Commission of Publicity and Efficiency for the Toledo City Council. These are Detroit, San Francisco, Los Angeles, St. Louis, Seattle and Toronto. New York, Buffalo and Milwaukee are among the municipalities which are considering the installation of municipally-owned bus lines. Some of the important facts about these lines are given in the accompanying table.

Of the municipal bus systems, three are public park lines. The primary purpose of these is convenience in making the parks more accessible, while the matter of revenue is a secondary consideration. Park bus lines are operated in Detroit, Los Angeles and San Francisco, and with the exception of the latter city are under the supervision of the park departments. In San Francisco the bus system is operated in connection with the municipal railways, as are also the Seattle and Toronto bus lines.

The experiences of these cities do not afford much hope of municipal bus lines being money-making propositions. In fact, none of these systems earns enough to set aside proper amounts for depreciation and other necessary charges. In Detroit, San Francisco, Los Angeles and St. Louis the initial purchase of buses was financed by appropriation. Five of the six buses in the Seattle system were donated by communities and one was purchased by the city. The Toronto buses were purchased by bond issue.

The old "nickel" fare is still in effect on the city buses in Detroit, San Francisco and St. Louis. Los Angeles charges 10 cents for adults and 5 cents for children.

In Seattle the city bus fare is 10 cents cash or 8½ cents, tokens. Toronto has the following complicated scale which applies to city trolley and bus service: 7 cents cash, four tickets for 25 cents and sixteen for \$1; night fare, 15 cents cash; children, 3 cents and school children, seven tickets for 25 cents. The fare on practically all the New York buses under the supervision of the Department of Plant and Structures is 5 cents.

Last year the Detroit bus line took in \$81,528.83 in passenger revenue, while the cost of operation, including repairs and overhauling, amounted to

\$80,237. Evidently nothing is set aside for depreciation and renewals.

The revenues of the San Francisco bus line in 1922 totaled \$38,900, while the operating expense was \$68,000. No charge was made for superintendence or overhead. The transfers from the trolley and school tickets at 2½ cents largely accounted

Fare and Route Data for Municipal Bus Lines

City	Year Started	Length of System, Miles	Number of Buses	Fare, Cents
Detroit	1911	1.5	10	5
San Francisco	1917	6.33*	5	5
Los Angeles	1920	7	5	10
St. Louis	1916	5	5	5
Seattle	1919	11.4†	6	10
Toronto	1921	5.88*	11	7

\*Two routes. †Four routes.

for this deficit. A charge of \$5,141 or 18 per cent of the receipts was set aside for depreciation. The net loss per day was \$73.11.

The five Los Angeles municipal buses brought in sufficient revenue in 1922 to pay operating charges and lay up a reserve of \$5,000, but no charge is made for depreciation, according to a statement by Van Griffith, the motor bus commissioner. Mr. Griffith declares that even if ample depreciation were to be charged against the \$5,000 reserve, there would still remain a balance.

The Seattle municipal bus system is not self-supporting, declares D. W. Henderson, general superintendent. This is partly due to the fact that this bus system is intended only as a feeder to the street railways.

In Toronto buses are merged into the municipal traction system so that it has not been possible to determine to what extent these bus lines were self-sustaining. But as in the case of Seattle, this fact is not so important if the buses develop future patronage on street car lines. The provincial statute which gives Toronto authority to operate its own traction system requires that a fare shall be charged which brings in enough revenue to pay operating costs, depreciation and renewals, as well as interest on bonds.

The Commissioner of Public Affairs of Buffalo recently recommended that the city buy fifty to 100 double-deck buses to operate between the public square and the different city parks.

A Milwaukee aldermanic committee is now considering the feasibility

of operating municipal bus lines there.

In New York City, Mayor Hylan desires a municipal bus system and Grover A. Whalen, commissioner of plant and structures, declares he can operate such transportation service at a 5-cent fare rate and net the city a comfortable profit.

In January, 1922, Mr. Whalen asked for a \$25,000,000 bond issue to purchase 3,500 buses and to provide garage facilities. It was proposed to use these on 201 routes covering 849.2 miles in the boroughs of Manhattan, the Bronx, Brooklyn and Queens. He estimated operating cost at \$36,849,000 and revenues \$40,880,000 a year on a 5-cent fare.

## Home-Made Filter Saves 50 per Cent in Oil Cost

INSTEAD of throwing away the dirty oil drained from his crankcases, E. L. Craft, bus operator of Harrisburgh, Pa., has developed a scheme by which he saves more than 50 per cent in the cost of crankcase oil. The idea is really simple and the materials required are easily obtained.

A steel drum or other form of metal barrel is used, by cutting one-third off the top. In this open end is placed a metal screen. To fit the screen to the drum the corners are bent at right angles, so that, when placed inside, these corners hold it up from the bottom. The center of the screen is depressed to make it bowl-shaped. In this depression, or bowl, a sufficient amount of waste is placed to make a thick pad. After a valve or spigot has been placed in the opening where the oil was originally drawn out (this should be an inch or more up from the bottom) the filter is ready for use.

The oil is poured in and allowed to filter down through the waste. This action clarifies the oil and, at the same time, a considerable amount of dirt is absorbed by the waste. If any dirt or grit finds its way through, however, it will settle at the bottom of the drum, so that the good oil can be drawn off through the valve. When the waste becomes dirty it can be easily removed, the drum cleaned and clean waste put in, when it is again ready for the filtering operation.

If desired, 30 per cent of new oil may be added to the filtered product when the crankcase is refilled.

# New Jersey Transportation Tangle Grows More Acute

## Personal, Political and Economic Factors Serve to Cloak Situation, Which Promises to Become a Matter for Supreme Court Action

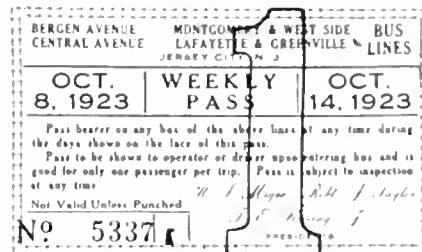
THE transportation situation in New Jersey defies definite diagnosis. Its aspects are too divergent for that. They are social; they are civic; they are economic, and they are political. So far as the physical operation of the buses is concerned, the situation is not very different from what it was before the Public Service Railway withdrew its service on Aug. 1, when its lines were tied up by a strike of employees.

While this is quite true, the bus operators and their spokesmen feel more than ever, justly or unjustly, that they are fighting for the right to live—fighting with their backs to the wall. So far as the Board of Public Utility Commissioners is concerned, that body has done little more recently than to reiterate its general stand that individual applicants for bus permits shall prove to the board the convenience and necessity of their service, after the required permits to operate have been secured in the local communities. There is nothing particularly new or novel in this. True, the board did urge the 5-cent railway fare for an experimental period, but this, if it is anything so far as the buses are concerned, is indirect rather than direct action.

As for the railway, its first thought after being ordered by the court to restore service after the strike was over was to fly to the 10-cent fare. In fact, it filed with the commission a tariff asking for this rate. On its part, the commission was quite frank with the railway. It seems to have shared with many others the thought that, perhaps, the answer to the question of the popularity of the buses was to be found in the 5-cent fare for short hauls, which most of them were charging. Quite frankly the board said that it was open to serious question whether the 10-cent fare on the railway would meet the situation. It suggested a trial for four

months of a 5-cent fare without transfers within the limits of the larger municipalities, and an additional fare of 5 cents for the longer rides to the end of the then existing 8-cent fare limits. To this the company agreed. The feeling of the board, publicly expressed, was that this plan would place the railway on a more equal basis in meeting the bus competition.

The board was not alone in this opinion. Similar views were held



*Weekly pass used on Jersey City lines. Sold for 90 cents and good any time between dates shown*

by the representatives of many of the municipalities. Some of them even indicated that the matter should be allowed to resolve itself into a test of the survival of the fittest, no matter what the effect might be of any such struggle upon the non-participants. To them the idea appeared to be remote of the possibility of a happy medium being struck.

No sooner did the Public Service Railway announce this fare reduction than the bus men having 10-cent local fares countered with fare cuts. In Jersey City bus fares were reduced from 10 to 8 cents with free transfers from line to line. A weekly pass was also installed costing 90 cents that entitled the holder to as many bus rides as he cared to take during the week. Furthermore, the bus owners assured the public that, as soon as operating costs could be reduced, their fare would go still lower.

Even before the phase was entered upon where the railway went to the

5-cent local tax, the representatives of the bus men began formally to inject the matter into politics. Pledges were sought previous to the primaries as to how prospective candidates for public office stood in their attitude toward the bus.

One group of Republican candidates for the State Assembly—twelve Essex County aspirants—went so far as to insert a plank in their platform expressing themselves as favoring legislation which would enable any municipality, or several acting jointly, to own and operate buses.

In the statement issued by the candidates the pledges were as follows:

1. We recognize the necessity for a stable and reliable system of transportation for the municipalities of our state under adequate control, and the operation of the buses as a necessary part of our municipal and interurban transportation service.

2. We favor the extension of the provision of the home rule act of 1917 to permit municipalities to own and operate, jointly as well as singly, the public utilities therein mentioned, including motor buses.

It may be that the matter will eventually become a subject for direct legislation. If so, the busmen have sought to anticipate the events. They want to be assured at the outset. As Governor Silzer sees it, however, the matter should not be allowed to become a political issue. When the transportation situation became acute, during the suspension of railway service, he rejected the proposal that the Legislature be convened in extra session to deal with the matter. His attitude was that there had already been too much politics in the situation and too much talk. So there this phase of the situation stands.

To summarize the matter, there are evidences of misgivings all around. The bus men profess to see in the 5-cent trolley fare a deep plot

to put them out of business. The railway people sought a 10-cent fare as their only way out. And the Board of Public Utility Commissioners urged a 5-cent fare upon the railway, which it accepted reluctantly. Neither of the two parties directly concerned is satisfied. Uzal McCarter, a director of the Public Service Railway, has gone so far as to say that the 5-cent fare is a failure. This rate has been in effect only since Oct. 1. Although no figures as to the number of passengers carried by the railway since Oct. 1 are available, there are figures showing what the situation is.

A comparison of the average number of daily trolley riders during the last eleven days of September with the average number for thirty-one days in July, the month prior to the beginning of the trolley strike, shows a decrease of 380,150 since the trolley service was resumed on Sept. 20. The total number of riders for the thirty-one-day period in July was 34,760,957, while the number for the last eleven days in September was 8,152,881.

The average daily number of riders in July was 1,121,321, while that for the eleven days in September was 741,171. July and September each had one holiday.

A larger decrease is shown by a comparison of the September, 1923, figures with those of the same month in 1922. The average number of daily riders in that month last year was 1,134,428, showing a decrease of 393,257 in this year's figures. The fare on the railway during this period was 8 cents, with four tickets for 30 cents and 1 cent for a transfer.

Not only did Mr. McCarter condemn the 5-cent fare, but he scored public officials for their alleged laxity in not enforcing the regulatory laws. Competition may be the life of ordinary trade, but, according to Mr. McCarter, it is the death of trade—at least local transportation trade under the conditions that exist at present in New Jersey.

Meanwhile the Public Service Railway has begun to act against bus operators alleged by it to be operating illegally.

Its first move took the form of a complaint to the utility commission containing a list of several hundred bus operators who, according to the railway company, were operating contrary to the Elliott act of 1921. All of these buses operate

on lines that parallel the tracks of the trolley company in northern New Jersey or in Camden.

The commission thereupon began the task of investigating these cases of alleged irregular operation. The bus men were summoned before the commission to show cause why they should not be prevented from further operation of their buses on the ground that they were operating contrary to law. In the subpoenas issued by the board no definite complaint was cited, however.

Frank H. Somer, dean of the New York University Law School; George L. Record and George F. Seymour, Jr., appeared for the bus men and George H. Blake for the Public Service Railway.

Counsel for the bus men took the position that the Public Utility Commission has no control whatever over the buses which are alleged to be operating illegally; that if they are operating illegally they can only be prevented from further operation as a result of proceedings by the state through the Attorney-General; that the Public Utility Board is nothing but an administrative board with the power to fix rates and to issue rules and regulations over service and similar jurisdiction.

Counsel for the bus owners re-

fused to recognize the jurisdiction of the commission in the matter of the investigation and declined to have their clients appear in response to the summons or to answer any questions put to them by the commission or by counsel for the railway. This move, of course, effectually blocked any progress as far as the investigation is concerned. Not one of the several hundred cases has yet been passed on by the board.

The proceedings above described took place on Oct. 17-18, and on Oct. 19 an adjournment was taken until Nov. 8.

Counsel for the bus men have declared to the commission that no attention will be paid by their clients to any disposition of the cases which the commission may make.

The commission countered by petitioning the Supreme Court, through counsel, for an order compelling witnesses to testify at hearings before the commission. On Nov. 1, President Thomas McCarter of the railway company declared that a month's trial of the 5-cent fare has shown that under existing conditions the rate will not produce "the cost of service." He added that the company was preparing a plan looking toward the purchase of the buses now legally operating.

## Floods Fail to Stop Bus Operation



**R**ECENT floods in Wichita, Kan., were so severe that they crippled the electric railways and some railroads but the buses demonstrated their ability to keep operating when all other means of transportation were tied up.

The accompanying illustration shows one of the business streets

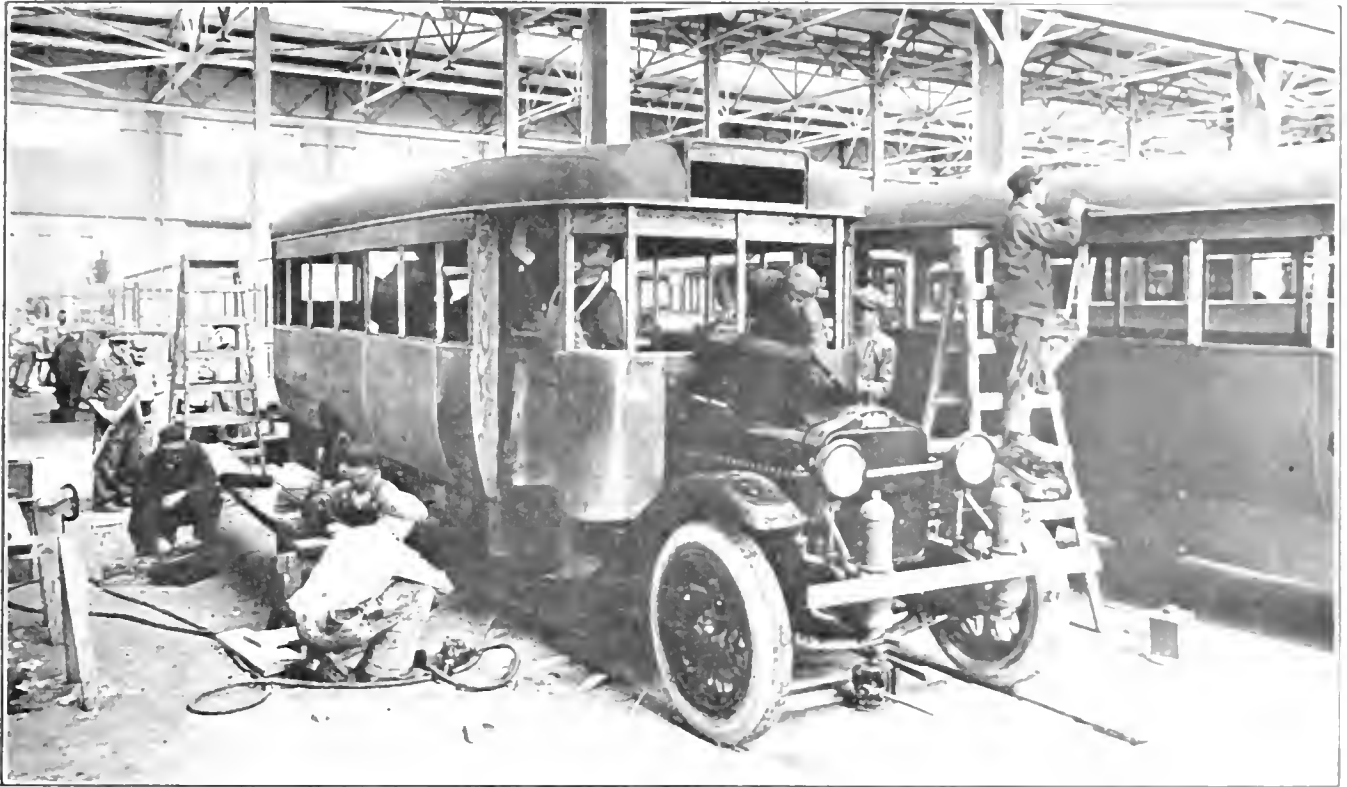
with motor cars pressed into service in place of the trolley cars. Auto trucks were also pressed into service and served well as buses.

The streets on which regular bus lines operated were served almost as well as at normal times except where the water was so deep that it flooded the motor.



# A Bus a Day Turned Out by Operator

New Twenty-five Passenger Body Designed and Built by Pacific Electric Railway — California Service Permits Operation Without Side Windows, Heating or Ventilating Devices—Construction Handled in Torrance Car Shops on Production Basis



**T**HE first big lot of street car type bus bodies to be built on the Coast have recently come through the shops of the Pacific Electric Railway at Torrance, Cal. Most bus operations, and therefore most of the body-building activities, in the Coast States are of the stage variety, requiring bodies of the sedan type with full-width cross-seats. Until the last year there has been little use of the street car construction, with the center aisle and two rows of transverse seats. Last February, however, the Pacific Electric Railway placed an order for eighty-one Model 50 White chassis, and, as was announced in BUS TRANSPORTATION at the time, determined to build the bodies for these chassis in the company's \$2,000,000 model car shops, which were placed in operation at Torrance two years ago.

Not only was the construction work handled in the company's car shops but its mechanical engineers worked out the design, shown in the accompanying illustration. Both the steel-frame and wood-frame types

*Bodies going through the car-penter shop. At the left, preparations being made to mount the apron along the side. Notice the number of men busy on the one body. No time lost here through lack of help.*

were carefully studied, and it was finally decided to adopt the latter as being more suitable to the company's manufacturing and operating conditions.

Since the word go ahead was given in February, the design has been prepared, construction arrangements made, as detailed later in this article, and sixty-two of the eighty-one bodies built and installed on the Model 50 chassis ready for service. This work was finished the last week in August.

## DETAILS OF CONSTRUCTION

On account of the good weather conditions that prevail in southern California (all the buses are operated in Los Angeles, Pasadena, Glendale, and adjoining communities) it was

possible to make some changes as compared with the ordinary type of twenty-five-passenger street car body. The Pacific Electric design, which is intended for one-man pay-center operation, is notable therefore because of omissions in equipment. Glass windows are lacking, being replaced by a sliding Pantasote curtain with celluloid lights. Heating and ventilating devices are also missing, the former being unnecessary and ventilation being supplied in adequate measure through the wind-shield, doors and other openings. But in other respects the bodies show evidence of all modern conveniences found in the latest types of electric cars run on rails. They are also equipped with every device for safety and comfort of passengers. Seats are large and roomy. Dome lights are provided along the center line of the roof and shock absorbers are mounted on the front of the chassis to secure easy riding.

By an ingenious arrangement the driver has a direct mechanical connection with the emergency door at

the rear end and can open it at any time he desires. This is accomplished by a 20-gage piano wire, which is led through an opening under the belt rail to the rear of the body, and then along the back between the panels and the rear seats through a piece of brass tubing of  $\frac{3}{8}$ -in. diameter to the bolt for the rear emergency door. As shown in the sectional view, passengers can also open this bolt by breaking the glass cover of a small box and pulling on a small ring there inclosed.

Transverse seats, of which there are five on each side of an 18-in. aisle, have 32x16-in. cushions and a back 29 in. wide. The removable seats across the rear end and backs for them were made in the company's shops to conform with the shape of the body. All these are upholstered in genuine leather.

Window curtains are arranged to slide out of the way between the headlining and the roof slats on 26-gage galvanized sheet iron guides. They can then be fastened up out of the way by straps hooked on to Murphy fasteners. While curtains have replaced the ordinary glass used for side windows, the windshield, front corner lights and the three windows in the rear end are of  $\frac{3}{4}$ -in. polished plate glass. In the top half of the service door this same glass is used, but the two lower panels are fitted with  $\frac{3}{4}$ -in. clear wire glass.

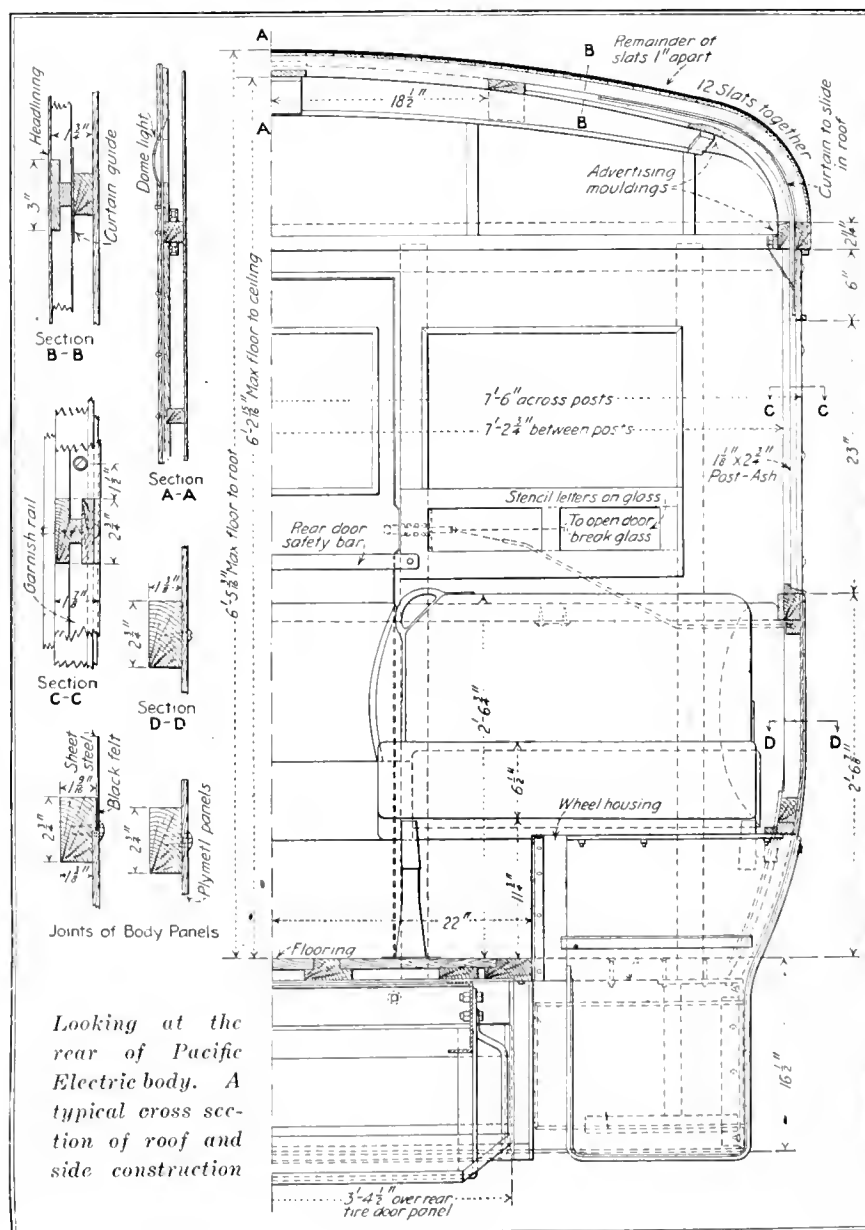
Inside the bus the ceiling is finished in a glossy white, and this, with the six dome fixtures, each containing a 21-cp. bulb, provide good light at all times for passengers. The dome lights are of the Tremont type, with Holophane glass and nickel finish bulbs.

Outside of the grip handles at the entrance and the pipe rail separating the driver from the passengers at the service door, stanchions, straps and other accommodations for standees are entirely missing. Evidently the company expects to carry only seated passengers. Other accommodations for passengers include a Feralun step tread, 7x24 in. at the entrance, and push buttons for a buzzer signal at each post inside the body. Advertising cards will be well displayed in  $2\frac{1}{2}$ x11 ash moldings located to take the standard 11x21 advertising cards. The buses are equipped with Ohmer No. 3 fare register.

Bumpers are used both front and rear. The front bumper is of 3-in. channel iron, 4.1 lb. to the foot, while at the rear a 1-in. pipe has been placed against the chassis frame, the



*Inside the new Pacific design is distinguished for its simplicity and air of restfulness. Side curtains which take the place of glass in each window are shown in two positions, full open or full closed*



*Looking at the rear of Pacific Electric body. A typical cross section of roof and side construction*



forms upon which were shaped the top bows and top rails. These members are not sawed, but are steamed until they can be bent to proper shape.

The mill started production of the framing, finishing it with machinery

#### Details of Pacific Electric Bus

Body over-all length, dash to rear of body.....	20 ft. $\frac{3}{4}$ in.
Length complete vehicle, over bumpers.....	26 ft. $\frac{1}{2}$ in.
Width between posts.....	7 ft. $\frac{24}{16}$ in.
Width across posts.....	7 ft. $\frac{6}{16}$ in.
Width service door.....	27 in.
Width emergency door.....	21 in.
Width main aisle.....	18 in.
Height, floor to top of roof, maximum.....	6 ft. $5\frac{3}{4}$ in.
Height, floor to inside of ceiling (headroom).....	6 ft. $2\frac{1}{8}$ in.
Over-all height, unloaded, ground to top of roof, approximately.....	9 ft. $\frac{6}{16}$ in.
Height ground to first step.....	18 in.
Height ground to floor at service entrance.....	2 ft. $\frac{7}{8}$ in.
Height, unloaded, ground to rear chassis frame.....	3 ft. $\frac{1}{2}$ in.
Side posts, center to center.....	2 ft. $\frac{7}{16}$ in.
Weight, body complete.....	4,025 lb.
Weight, chassis and body.....	9,425 lb.
Weight, rear end of bus complete.....	6,250 lb.

up to the point where a minimum of hand fitting was required in assembling. Framing was put through the mill in lots for ten buses. This was considered a sufficient quantity for economical working by the machine. At the same time the mill could handle a certain amount of building materials for which there happened to be an unusual demand.

The mill work being completed, erection was undertaken in the carpenter shop. Forms were constructed to hold the floor frame, to speed up the assembly and secure uniform results.

With the erection of the side and end framing the bus was ready for the top. Before this point had been reached, these tops were framed complete in the cabinet shop on special forms and passed into the upholstering shop to be covered. Blacksmith and machine shops had meanwhile completed the body irons. These are considered of the utmost importance in producing a durable construction.

While all this other work was going on the tin shop completed shaping the corner panels and other metal parts. All the paneling being in place, the body was mounted on the chassis. When delivered at the shop the chassis were equipped with self-starters, complete electric systems and front air shock absorbers. Upon arrival a rear bumper was applied to each chassis, and it was then sprayed with the company's standard color, a Tuscan red, and was ready for the mounting of the body.

Several undercoats of paint were given the body while it was still in the carpenter shop. Bus doors which had been fabricated in the cabinet shop were then fitted and steps and mud guards applied. The body was wired for lights and the headlining installed, so that all cutting and fittings were finished. The next step was to send the mounted bus into the paint shop.

Here six to eight buses were usually being handled in various stages. Because of the coats applied in the carpenter shop the total time in the paint shop was reduced two or three days. After the surface had been brought up and the color coats applied, each bus was given two coats of finishing varnish. By this time the special seats and curtains were finished by the upholstering shop and the bus fitted up by the trimming

force. Lights and signals were completed by the wiring shop and the bus made ready for service, all in ten to eleven days after the frame was started in the carpenter shop.

Thus it is seen that the company has had to handle two difficult problems. First, it was necessary to design a bus body to meet its own operating conditions. And next this body had to be built, forms and materials made and secured and production of a large number of bodies secured.

The success of the complete project is demonstrated, it would seem, by the illustrations of the new body as shown in this article and by the record made in building the bodies represented and putting them into active service. All this design and construction work was done in less than eight months.

## Skip Stops Used in Toronto

THE Toronto Transportation Commission, operating the local tramway system, has used buses since 1921 to supplement the street car service in the Humber-side-Runnymede district, which lies in the western part of the city. There are eight buses in all, seven in daily use and one for emergency. Five different types are represented; four Fifth Avenue, one Leyland, one Associated Equipment Company (similar to that used by the London General Omnibus Company), one Tillington-Stevens, an English gasoline electric design, and one Veteran manufactured in Hull, Quebec. All of these are fitted with double-deck bodies.

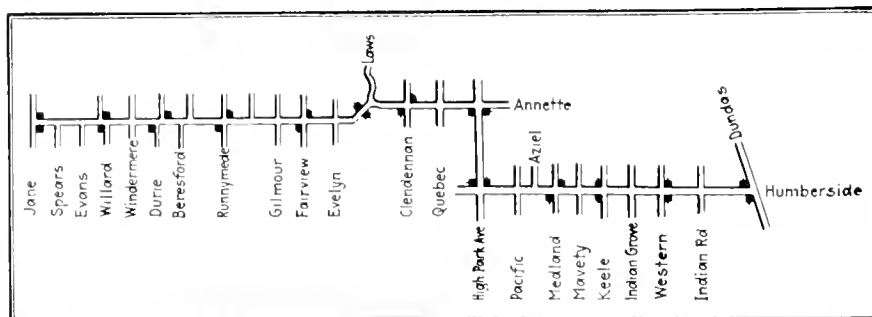
An average of 179 trips are made each day, over a route estimated at 3.56 miles round trip. The time to make the run averages twenty-four minutes.

The first bus leaves the garage at 5:44 a.m. and the last one is in at 12:45 a.m. By 6:30 in the morning

all the buses are out and full service continues until 9 o'clock. This is true also of the afternoon peak, from 5 p.m. until 7:10 p.m.

About 7,500 passengers are carried each day, and more than 500 of these do not ask for transfers to the city street cars. The straight bus fare is 7 cents, so that the revenue is considered a good return for service that merely supplements the street cars in one part of the city.

In Toronto the buses do not stop every block as in most cities. Fixed stops are designated, as indicated on the stop map, this resembling the skip-stop system used by many street railways. As a rule the intervals are only two or three blocks. These stops were changed slightly last December, when the route was extended to Jane Street, an addition of 0.84 mile to the round trip. The number was increased from twenty to twenty-six for the round trip, thus keeping the stops per mile (7.06) the same.



Stop map for Humber-side bus route, Toronto, Canada

# Buses Stand Out at Railway Convention

Exhibits at Atlantic City Indicate Steady Advance in Construction  
—Engines, Brakes, Bodies All Show Improvements  
to Meet Operating Requirements

**S**TEADY progress, rather than any startling developments, was the main feature of the bus exhibits at the October convention of the American Electric Railway Association. But when it comes to size and variety of these exhibits and to the interest taken in them by visitors, then it would not be right to say that the progress has been steady since or during the last year. Rather, the advance has been of the express train order. At a meeting of the engineers connected with the association this formal resolution was passed: "The excellence of the bus exhibits and the evident interest therein have vindicated the policy of encouraging the manufacturers to adapt their equipment to mass transportation needs."

The best method of indicating this rapid growth in bus interest is by the space taken at the exhibits. Last year at Chicago the bus and its accessories took up 6,800 sq.ft., or about 11 per cent of the total space devoted to all exhibits. This year the total space used was slightly larger, but the bus, figuring in as before chassis, parts and accessories, was responsible for nearly 17,000 sq.ft., or 22 per cent of the 76,000 sq.ft. devoted to exhibits. There was a similar increase in the number of exhibitors of bus equipment, and from all reports of sales already made, or well along toward completion, the manufacturers were well pleased with the response. Certainly, the bus exhibits were busy all the time, and not only railway men but other operators from all parts of the country were on hand to study the latest construction.

## THE LATEST IN CONSTRUCTION

The demonstration buses, of which there were a number outside the convention hall, drew admiring crowds and many of the convention visitors were taken on rides in the neighborhood of Atlantic City. While no hill-climbing stunts were possible near by, still there was a sufficient variety of roadway to show riding qualities and of traffic congestion to

indicate maneuverability and braking control.

Rolling stock, such as the chassis, bodies, unit parts and equipment represented almost 100 per cent of the bus exhibits. There was practically nothing in the way of maintenance. One maker of a lubricating device was on hand, but it was in the electric end, in equipment for maintaining trolleys and the like, where the maintenance equipment was found. On the other hand, complete trolley cars were absent, a fact commented on by many of the railway men present.

## MANY POWER BRAKES

The actual advances shown were so numerous that it is impossible here to mention them in detail. Some of the accompanying photographs tell the story to a certain extent. Frames continue to come down. One maker had a chassis which permitted a 6-in. lower floor level than its previous standard, secured by underslung springs and smaller tires. Two makers came out with six-cylinder engines. There were rumors of others that are still in the factory experimental department. Constructions to secure better braking were noticed in a number of designs. Air brakes were fitted to seven chassis. One prominent maker who formerly supplied his bus chassis with a drive-shaft brake and a single set on the rear had a design with two sets of brakes on the rear-wheel drums. Metal brakes were in evidence, with a single set of shoes that could be controlled either by air or manual means. Four-wheel brakes were found also on two designs, one of these controlled by "air" taken from the engine cylinders, the other being of the mechanical type.

Of the bodies shown, the street car type was by far in the majority. Many improvements in construction, leading to better methods of handling passengers and greater comfort, were on view. One of the double deckers was designed for a removable cover, so that the top deck could be used for winter operation. Most of

the sedan bodies were fitted with smoking compartments, a swinging door separating a space at the rear to carry six or eight persons. What was really a combination of sedan and street car type was represented by a body with a narrow central aisle, but with the heavily upholstered seats characteristic of the de luxe vehicle. On another sedan body the rear baggage compartment was fitted with side doors, so that the driver could unload from the curb without having to work in the streets.

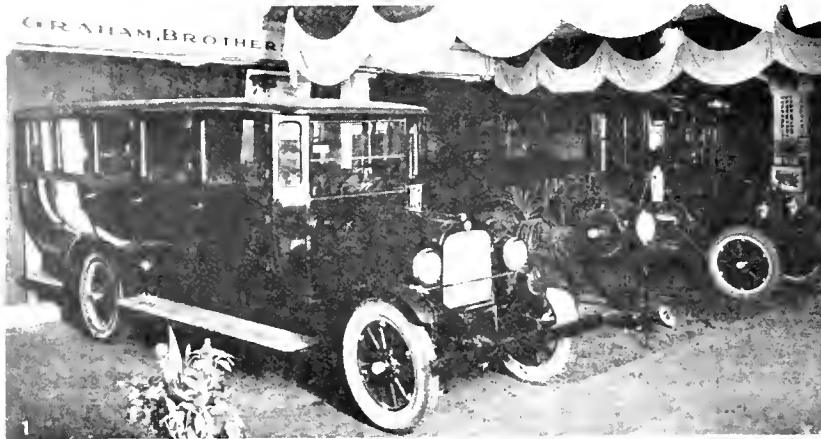
Several well-thought out schemes for better service doors were noted. One maker showed a door split in the center, the two leaves folding back to each side of the service entrance. Another placed his door-opening mechanism underneath the body, the drive control being by a hand lever similar to that used for emergency brake or gear shift. The door lever, however, was at the left hand side of the driver's position. A device for opening the service door by "air" pressure was on view, this consisting of a small pneumatic engine operated by the movement of a small lever at the driver's position.

## BODY IMPROVEMENTS

In the field of body supplies and fittings there were many new developments. One maker of bodies exhibited a coil-type heater built up of short lengths of pipe joined at the ends of cast aluminum manifolds. This can be taken down to clean the tubes, and two of them are placed in the front side of the body. On another body the complete window trim was aluminum, the sash and sliding mechanism both being made of this metal. Other body supplies included panel and headlining material, hardware, stair treads, seats, upholstery, lighting fixtures, paints and varnishes.

In addition there were many units or accessories for the chassis, such as shock absorbers, steel wheels, engines, safety fenders, anti-friction bearings, electrical equipment, and a varied assortment of fare collection devices.



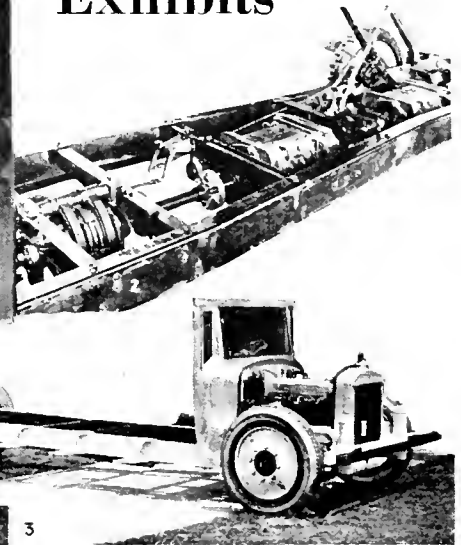


No. 1. A pair of Graham fifteen-passenger sedan and eighteen-passenger street car types at electric railway convention.

No. 2. Underneath the Brockway trolley bus, which was shown on the Atlantic City boardwalk. Electric motors connected in tandem.



## Some A. E. R. A. Exhibits



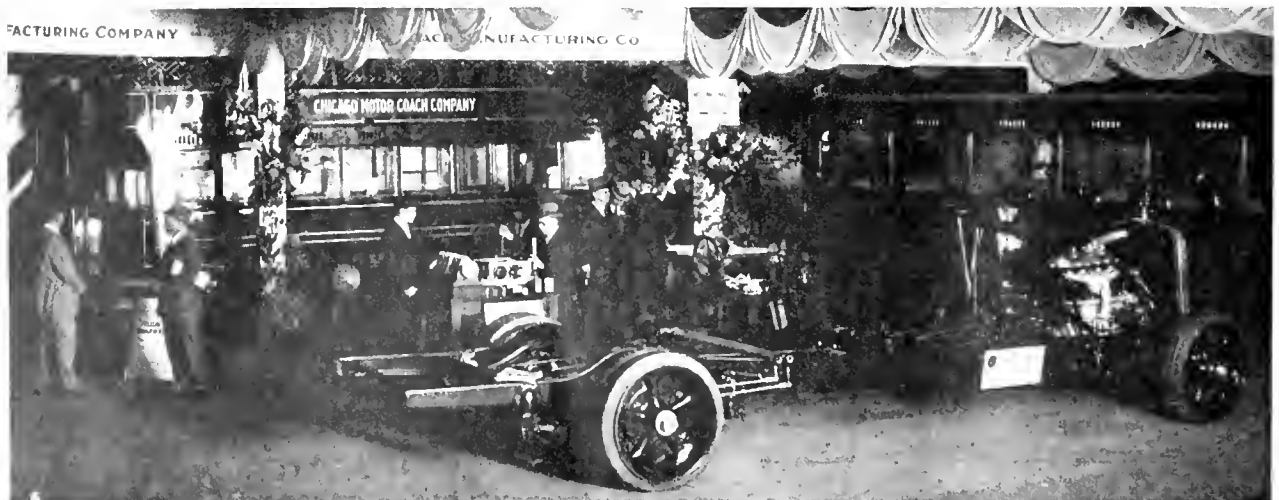
No. 3. The Fageol chassis, Hall-Scott engine, Timken axles front and rear, and Westinghouse air brakes. Fitted with outriggers to support body.

No. 4. Federal revealed its new six-cylinder bus chassis. Body is Brown eighteen-passenger. This company also displayed a new twenty-five passenger job, with Kuhlman body.

No. 5. A Garford de luxe coach. Body is the new Superior. Sedan comfort and central aisle (11 in. wide) to handle passengers. Seats twenty-three. Separate smoking compartment at rear.

No. 6. Here are the Yellow coaches—a sixty-nine-passenger double decker, twenty-nine-passenger single decker and the "Z" type chassis used for each. Also axles, engine and other important units.

*Convention views by Atlantic Foto Service*







### Along Gasoline Alley

No. 1. Model 50 family—White chassis. Brown twenty-five seater and Bender twenty-one passenger de luxe.

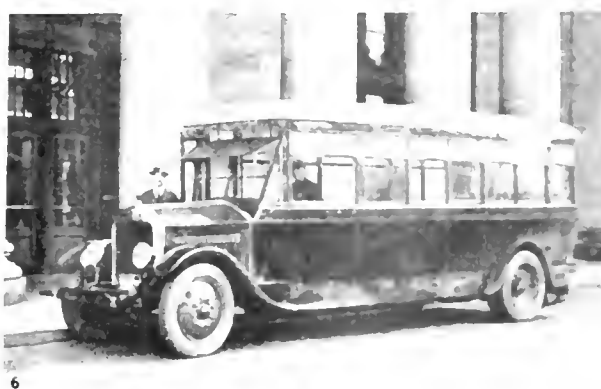
No. 2. From Fifth Avenue, New York. Type J single decker and two Type L double deckers.

No. 3. The Speed Wagon chassis. Also a Reo with FitzJohn Erwin twenty-one passenger body.

No. 4. This looks like before and after. The Mack at the left has underslung springs and doughnut tires.

No. 5. Model "K" Acmes with built-up frames. Body is Brown twenty-five passenger street car type.

No. 6. Six-cylinder dual-valve dual-ignition engine here. New Pierce-Arrow bus chassis with Bender body.



## First-Hand Observations in London

BY PAUL WOOTON  
Washington, D. C.

LONDON soon will have more than four thousand buses engaged in passenger transportation. On Sept. 1 the General Omnibus Company had 3,500 buses in service and was adding new buses at the rate of fifty per week. That rate of addition will continue until the full 4,000 mark is reached. In addition, there are 120 other buses running on the same routes as the General buses. These 120 buses are owned by forty-five different owners. They really are parasites on the larger concern. They run under the same route numbers and ply only in the more favored sections.

The matter of granting a monopoly to the General company is being agitated more and more by the public. The company itself has made no such request. Thus far the authorities have shown a disinclination to consider the proposal. While it is evident that the demoralizing effect of the present situation must be recognized, the average public official is very wary of monopolistic rights even when the operation is publicly supervised. The result is that the large company must meet the competition in its own way, which it does by concentrating its own buses on the routes on which the small operators ply. The effect is to rob the outlying services of buses.

During the first thirty-two weeks of the current year 724,500,000 persons were carried on the buses of the General company. This was an increase of 125,000,000, or 21 per cent, compared with the fares paid over the corresponding period of 1922. The buses in the 1923 period, however, operated over 19 per cent more miles. During the same period of 1923 the underground railways carried 187,000,000 passengers, which indicates a decrease of 15,000,000 as compared with the first thirty-two weeks of 1922.

There is no doubt that the increasing popularity of the bus is taking short hauls away from the underground lines. In London the buses are owned by the same interests which operate the underground lines so the revenue goes into another pocket of the same trousers.

It is very evident, however, that short underground lines cannot live in competition with a highly developed bus service.

The buses in London have cut heavily into the traffic of the tram lines. At rush periods, however, the tram enjoys an advantage, since it can earn more with its seventy-eight seats than can the bus with its fifty-two. For the full day, however, the buses are earning more per mile than are the tram cars.

Experience in London is demonstrating the very great advantage of the bus with seats on the top of the vehicle. Few places have worse climatic conditions with which to contend than has London, yet there are only 27 per cent of the days of the year on which the use of top seats is prevented by the weather. Except for such times when rain is falling heavily, these seats are more in demand than are those below. A rubberized apron is attached to the back of each seat. It can be drawn across and fastened to the back of the seat behind. Its main purpose is to keep rain off the seat, but passengers have found that it serves admirably as a waterproof cover.

### WORK FOR THE ARBOLIST

The problem of using top seats on well-shaded streets has been solved in London by the maintenance of a work bus for tree-trimming service. This bus is in the hands of an expert arbolist who knows how to clear away low-hanging branches in an artistic way. He is careful to do the pruning during the period of the year when no harm will result to the tree. Where, for any reason, the branches of the trees cannot be cleared away the bus is operated in the middle of the street. Under British law, however, the full width of the street must be kept free for moving traffic. For that reason bus operators are in a position to demand the removal of trees which interfere with their operations. But in no instance has it been necessary to resort to the law in that particular.

One of the more serious problems confronting bus operations in London is the slowing up of all traffic due to congestion. The speed of bus operation in the main business district has decreased 2 miles per hour during the last six months, and

in August was getting worse rather than better. Last year buses plying the busiest streets could cover 9 miles per hour. This year the average has fallen to 7 miles. The uncertainty as to progress during certain hours is known to have had its influence on the number of passengers carried.

While the handling of traffic is particularly difficult in an old city, such as is London, there is very great room for improvement in the methods now employed. The number of motor vehicles in England increased 25 per cent during the twelve months ended with May, 1923. A substantial portion of that increase was in the London area. Since there are few alternate routes available, due to the absence of parallel streets, a large amount of traffic must follow certain thoroughfares. The streets for the most part are narrow. An unusual number of horse-drawn vehicles still are in use in London. While they carry only 5 per cent of the tonnage transported on the streets, they unquestionably slow up the movement of the other 95 per cent to a very considerable extent. Since the business situation is such as to make the time very inopportune to force the capital investment necessary to the motorizing of all transport, the authorities are not inclined to curtail in any way the use of the streets by the horses.

Due to the fact that London is composed of twenty-eight separate municipalities, with a large number of independent highway authorities, the traffic situation has been aggravated by the almost total lack of co-ordination in the conduct of street improvements.

The only effective way of improving the situation seems to be a substantial widening of certain streets. It is believed that much of this can be done without great expense for right-of-way. While property values are enormous, the enhancement in value which follows street widening reduces very materially the amount of remuneration the property owner can claim.

The Ministry of Transport has a bold scheme for relieving the traffic situation in London by cutting through a series of arterial streets. Portions of these new arteries leave untouched the existing streets allowing them to carry what traffic they can. Their course is through the structures in the slum districts which lie just back of many of the principal thoroughfares.

[NOTE—This article, and another which will follow, is based on recent personal investigations of the Washington correspondent for the McGraw-Hill publications. —Editor.]

# Co-ordinated Transportation Favored at Electric Railway Convention

Bus Looked Upon as Useful Ally to Allow Fullest Development of Cheap and Popular Transportation — Reports Presented on Taxation and Highway Construction — Operating Experiences of Many Railways Described

THE motor bus, whether double or single deck, sedan or street car type, with leather or rattan upholstery (all of which were displayed by the manufacturers) was very much on deck at the A. E. R. A. convention. Present and future operators gathered Oct. 8 to 12 at Atlantic City to discuss the use of buses—as feeders to the trolleys, in supplemental service at a higher fare, and how they should be handled—by operating, maintenance and accounting departments. Thus can the forty-second annual meeting of the American Electric Railway Association be looked upon as the turning point. The predominating sentiment of the railway men has changed from one of antagonism to one of appreciation of the bus. Their former desire to quash the bus by fair means or foul has been apparently replaced by a more constructive attitude. They are now studying how best to use this transportation tool.

Already, according to C. D. Emmons, head of the United Railways & Electric Company of Baltimore and the Baltimore Transit Company, in his presidential address, more than 100 electric railways are operating more than 1,000 buses. They have invested upward of \$6,000,000 in them and hundreds of thousands of dollars in garages and service stations and equipment. Two companies alone have invested more than \$1,000,000 in buses during the last year.

Whether bus transportation is profitable at present is open to argument, Mr. Emmons said. In some places it is and in others it is not. Where buses can be operated in densely populated districts and where the hauls are short they can be operated profitably at street car fares, but in general transportation they can serve the public only at a higher fare. Problems connected with proper design of bodies, proper apportionment of weight on axles,

proper tires and other equipment, as well as accounting systems that will make it possible to determine the real cost of operating buses, have yet to be worked out.

The automotive industry, Mr. Emmons continued, is showing every desire to co-operate in bringing about co-ordination of electric rail-

## *Duty of the Public*

These railways have no quarrel with the bus except when the bus enters territory that is rightfully that of the electric railway. I say "rightfully" because the states and communities, in giving the railways the right to do business in the streets, retain to themselves the power to regulate service and control rates of fare. Having done that, the duty of the public to the railway should be obvious—the public must protect the railways in their rights, else the public itself will be the loser.

—President C. D. Emmons

way and motor bus transportation. There was a time when the automotive industry seemed to think that the vehicles it produces could supplant the electric railways, but experience has shown them what it has shown the public as a whole, that the electric railways have a distinct field in handling mass transportation, that electric cars afford the cheapest means of transportation of the masses, that bus competition is ruinous, and that when buses are operated in public transportation the street railway in each community is best equipped to operate them.

Other electric railway officials who indorsed co-ordination of bus and trolley were L. S. Storrs, president the Connecticut Company; D. W. Pontius, general manager Pacific Electric Railway, and W. F. Ham, president Washington (D. C.) Rail-

way & Electric Company, all operators of motor buses in connection with city or interurban electric properties.

A study the United States Chamber of Commerce is making of the national transportation situation was reviewed by P. H. Gadsden, the association's representative. Each field of transportation is being given careful attention, he said, especially that phase of highway transport which utilizes motor trucks and buses in place of other forms of transportation. Without attempting to forecast the result, the speaker pointed out that the report would do much to clarify the position of the different transportation agencies. In any case, it should be approached from an economic standpoint of what is best for the community involved.

Different phases of bus transportation were covered by several committee reports. These took up the development of motor buses and trolley buses, uniform regulatory laws, construction and maintenance of highways for motor vehicles, a study of the extent, costs, reasons for and methods of bus operation by railway companies, and a suggested system for the classification of operating costs.

## RAILWAY BUS OPERATION

The report of the committee on bus operation, which was reviewed by Chairman W. J. Fleckinger, was one of the most comprehensive and important presented during the convention. It consisted primarily of a review of what is being accomplished by electric railways operating motor buses. In addition there were valuable sections on maintenance and accounting practices. The committee found that railway companies are rapidly adopting the latest types of bus design. It warned automotive engineers that simplicity and accessibility are essential, and favored the unit repair system to minimize time out of

service. The basis of charging depreciation was discussed and operating costs tabulated by the committee; both of these are referred to in the abstract of the report which follows:

Of seventeen companies reporting, seven operate supplementary service, twelve feeder service and nine independent service. Looked at in another way, seven of the companies operate exclusively on city routes, four on suburban lines, two in interurban service, two in city and suburban service, one in city and interurban service and one in city, suburban and interurban service. The base operating schedule calls for 185 buses, while the peak requires 225 vehicles. On the average, each bus travels 134 miles per day, while the individual mileage reported varies from 70 to 216 miles.

*Types of Equipment.*—The type of motor bus equipment used indicates the twenty-five-passenger bus to be the most favored, with the fourteen- and eighteen-passenger vehicle following in the order named. The type of chassis most commonly operated appears to be the White Model 50, which nine companies report using. Five companies have Reo and Republic, while four report Mack. Other types are not used by more than one company. Pneumatic tires are reported in thirty-one cases, and in nine cases duals are used on the rear wheels, while cushion or semi-pneumatic tires are used in only ten instances.

*Operation and Maintenance.*—Where buses are operated with the railway service schedules should be so laid out and maintained as to correlate the service from both facilities. This result can be obtained with the best economy if the same supervisory organization is responsible for both. However, where a route is operated independently of the street railway service, it may be found desirable to supervise it with a separate organization.

Most of the street railway companies operating buses are doing so on such a small scale as not to warrant the increase in overhead and maintenance costs necessary if the repairs were entirely divorced from the electric car work. The committee believes, however, that this practice ceases to yield maximum efficiency and economy the moment the number of units becomes large enough to keep a separate corps of mechanics, inspectors and cleaners busy during a full working day. Bus chassis maintenance requires an entirely different line of training than that of electric car maintenance and if an attempt is made to spread the supervision and maintenance over both types of equipment, the maintenance of both will be unsatisfactory.

The body maintenance presents an entirely different situation. Bus bodies are now very closely following the type of construction used in electric car bodies and this work can be more efficiently and economically done by augmenting the regular body maintenance force sufficiently to take care of the additional equipment.

*Fares and Fare Collection.*—The majority of the companies are maintaining the same rate of fare on both the bus and the trolley car. According to the report, the cost of trans-

porting a passenger by bus is greater than by trolley, showing the reasonableness of a higher rate of fare on the bus, particularly where the volume of traffic is so low that the railway will not produce sufficient volume of traffic to meet the cost of operation, or where the bus provides a more expeditious service than the trolley car.

*Basis of Charging Depreciation.*—None of the companies, by reason of short experience, is in a position to give definite information relative to the life of bus equipment. All of the depreciation is set up on a tentative basis with the idea of revising it, after experience, to the basis of actual conditions. So long as depreciation is recognized as a part of the cost of operation, it will make small difference under present circumstances whether it is figured on a straight line or mileage basis.

The cost of the original tires on the bus should not be considered a part of the amount to be depreciated. Theoretically the amount reserved out of revenues during the period a bus is operated should equal the original cost of the bus (excluding the tires) less its salvage or turn-in value.

Consideration must also be given to obsolescence and inadequacy, as well as wear and tear, in calculating depreciation charges. Physical depreciation, or the wear and tear of the bus, depends substantially on the following nine factors:

- (a) The design of the bus.
- (b) The quality of workmanship and material used.
- (c) The character of maintenance.
- (d) The efficiency of the driver.
- (e) The grade and proper use of fuel and lubricating oils.
- (f) The loads carried.
- (g) The rate of speed.
- (h) The character of service performed.
- (i) The road conditions.

Because of these variable factors, it is difficult to suggest a standard practice for charging depreciation occasioned by wear and tear.

The factor of obsolescence, another element of depreciation, but not occasioned by wear and tear, should also be a matter of consideration, especially where there is likelihood of an appreciable advance in an art.

The factor of inadequacy is also an element of depreciation. It is a burden which operates on the income in precisely the same way as obsolescence and is as difficult to measure. The factor of inadequacy in depreciation is substantially occasioned by the traffic demands.

Assuming that the replaced bus, or its parts, could not be further utilized the charges against income over and above the reservations made out of revenues for depreciation occasioned by wear and tear would reflect the factor of inadequacy. This burden may be kept within bounds or eliminated in at least two ways:

First—Buses found to be inadequate in regular service may be further utilized or their major parts utilized.

Second—The size of the buses necessary to accommodate the traffic demand and traffic growth may be reasonably determined if consideration is given to construction and overloading.

Because of these widely variable depreciation factors, each company must study its own situation and from future experience develop such method as will adequately provide for renewals or replacements as they become necessary.

Depreciation on garage buildings and

equipment must also be taken into consideration. As these facilities do not vary considerably from those generally used in railway operations it is safe to assume the same rate of depreciation in both cases.

No standard practice for providing for accident liability is suggested. Of the seventeen companies giving information, six set aside from 3 to 6 per cent of their gross revenue. In other cases the requirements as prescribed by law, either state or municipal, are followed. Generally speaking, each bus carries \$1,000 property damage and \$5,000 and \$10,000 liability insurance for any one injury or accident.

*Attitude of Public.*—With one exception, the attitude on the part of the public favors bus operation by the street railway companies. This indicates that the public is showing a preference for dependable service by a responsible, experienced transportation agency.

It is also recognized that through supplementing the rail service with buses additional territory is being served which could never hope to receive service from individual bus operation without a guarantee of immediate profit.

The tabulation of operating results (page 525) represents a picture of what may be expected in the future. Certain elements of cost are as yet indefinite. None of the companies has been operating buses much longer than a year, consequently, their maintenance costs have had an advantage from the fact that their equipment was new and did not require heavy expenditures for repairs and renewals. It is quite possible also that the change from the truck chassis to one designed for passenger transportation may result in a decrease in this item.

So far the bus has had the advantage over the electric car by reason of the fact that the roadbed has been provided and maintained out of the general tax fund, but as the question of commercial use of highways is at present being given serious consideration throughout the country, it is entirely probable that the item of taxes will sooner or later be materially affected through changes in methods of taxation.

The most important factor to bear in mind in comparing the cost of bus operation with that of electric car operation is that, by reason of the smaller seating capacity of the bus, the cost per passenger is considerably higher than for electric car operation. The average cost per bus-mile, including taxes and estimated depreciation, based on the figures shown in the accompanying table is 24.6 cents. It is fair to assume the average seating capacity per bus to be twenty-five. On this basis, the cost per seat-mile is 0.98 cents.

Data obtained from ten companies operating one-man trolley cars, seating an average of forty-two passengers each exclusively, shows a similar average cost per car-mile of 25.7 cents. This results in a cost per seat-mile of 0.61 cents. On this basis the cost per seat-mile of bus operation is 60 per cent greater than for the one-man electric car. These figures, however, do not include a return on the value of the property.

The committee reports it is unable to furnish any historical data of value on trackless trolleys, as experience by member companies is confined to four

companies operating a total of seven buses and two in Canada operating a total of eight, none of which has been in service a sufficient length of time to furnish reliable data.

Another year, however, should be fairly productive of information, as the committee is informed that installations are contemplated at Richmond and Norfolk, Va.; at Philadelphia; at Rochester, and at Detroit.

#### DISCUSSION OF BUS OPERATION

H. W. Alden, president of the Society of Automotive Engineers, pointed out that co-operation of electric railway and automotive interests is essential to proper development of transportation. The bus is here to stay and should be incorporated in the general transportation scheme. The report covers only street railway companies, and Mr. Alden suggested that the costs presented would have been somewhat different if reports of independent companies had been included, because a great many bus companies are making money. His discussion follows in part:

The general summary of the results reported by your twelve companies investigated shows a net loss. We should not jump at the conclusion that this is a chronic and expected condition. Your report, however, does show that four out of the twelve companies had a revenue in excess of expense. Two of the twelve had such ridiculously low revenues that it would seem that they had tried to operate under impossible conditions.

Furthermore, the investigation covers only single-deck buses. Now there are many places where a double-deck bus is to be desired, as evidenced by its success in London, New York City, Chicago and Detroit, in all of which cities the revenues exceed expenditures by a comfortable margin.

I venture to suggest that in some cases the proper equipment was not

chosen. Too much care cannot be given to this point. Differences in types of vehicle may easily be the difference between red and black figures at the end of the year.

Proper routing is another important

#### How to Establish Co-ordination

The necessary preliminary to any effort to co-ordinate bus and trolley is a public opinion that will support a legislation which recognizes that the two agencies are merely different means of providing a convenient and needed public transportation service which must be unified in order that the various communities may have a thoroughly efficient transportation service at the lowest possible rate.

In any state where legislative acts recognize this situation, it is a much easier task to accomplish a co-ordinated public transportation service.

—L. S. Storrs,  
Connecticut Company

element, probably not any too well understood as yet.

The speed of operations is a very important factor not very thoroughly covered in the report. A change in engine size, gear reduction, etc., which would raise the average speed of a city bus even so much as 10 per cent might also change a loss to profit.

Little appears in the report on special forms of equipment for special services which may, when properly catered to, mean the difference between a deficit and a surplus. The motor bus is excellently adapted to give express service, which is something that even

double track street railways cannot give. The single-deck bus, furthermore, creates a traffic of its own and people delight in the upper deck comfort. I think it is a good thing to bring out the fact that when all of these features are taken into consideration, the fact that the motor bus is a more economical mode of transportation is quite a different question.

It is better to have a few motor buses than a large fleet of single-deck buses, very much as it is better to have a few motor trucks than a large fleet of trucks, even though the motor trucks are not the type of vehicle used for the same consideration as the motor buses. Motor buses are more adapted to the city roadway department.

I had expected a complaint that your members had been compelled to pay built-over commercial cars and chassis. The motor bus builder is open to criticism, in nearly all cases, in trying to do just this thing. Some of the companies, of course, have recently developed new equipment. Bus service demands equipment designed from end to end primarily for bus service, because conditions and requirements are totally different from those resulting in merchandise transportation.

On the subject of depreciation there is a wide variation in practice. Surely these figures might be brought more nearly uniform. On the whole, it seems as if the figures taken are unreasonably high. Given the right equipment; that is, one which will not soon become obsolete, a ten-year life is not unreasonable, when the vehicles are operated under good maintenance practice. The table gives depreciation at about 13 per cent of the total expense on the average. This seems high, when there is the evidence of the London General Omnibus and the Fifth Avenue Coach Company that indicates 7 or 8 per cent as being adequate.

It is very gratifying to see the earnest purpose of your association to take up this new instrument, which our industry has produced, and to give it a fair trial. We are just beginning to understand the problems to be met and appreciate now the necessity of quite special equipment. Working with you, we can more and more meet your

Company.....	OPERATING RESULTS PER BUS-MILE *												Weighted Average
	A	B	C	D	E	F	G	H	I	J	K	L	
	11.23	11.22	71.22	526.22	11.22	31.22	11.22	121.21	73.22	73.22	11.22	41.22	
	to	to	to	to	to	to	to	to	to	to	to	to	
	531.23	331.23	331.23	331.23	331.23	331.23	331.23	1130.22	331.23	1231.22	1231.22	531.23	
Transportation revenue...	Cents 26.50	Cents 21.18	Cents 28.67	Cents 13.42	Cents 25.99	Cents 25.25	Cents 19.23	Cents 6.11	Cents 20.84	Cents 29.79	Cents 7.40	Cents 26.28	
Other revenue			69	04		02	06		04	76	33	24	
Total revenue	26.50	21.18	29.27	13.46	25.99	25.27	19.29	6.11	20.88	30.55	7.73	26.52	
Maintenance (excluding depreciation and tires)	3.83	1.95	4.50	1.62	3.02	6.56	4.00	2.62	5.42	6.71	2.47	2.47	4.20
Tires	1.50	1.94	1.49	1.32	.85	2.48	2.43	1.87	1.65	2.00	1.31	.47	1.88
Depreciation	3.00	2.68	3.88	3.25	2.29	3.96	2.67	7.19	8.03	2.82	2.68	.03	3.08
Wages of bus operators	7.68	5.65	6.49	6.09	7.03	6.91	6.05	6.43	5.64	4.61	5.42	6.04	7.74
Other conducting transportation expenses	4.83	3.26	10.19	5.84	7.18	7.67	5.06	4.60	7.01	3.35	5.24	7.21	6.44
Injuries and damages, insurance, other general expenses	3.25	2.52	3.44	.77	6.56	3.04	3.33	.57	.74		.54	2.86	.61
Total	24.09	18.00	29.99	18.89	26.93	30.62	24.14	23.28	23.51	21.48	11.43	16.62	25.69
Net operating revenue	2.41	3.18	.72	4.57	.97	4.61	4.81	2.83	7.34	9.07	6.30	9.90	8.76
Taxes	.92	.25	2.10	.60	.15	.24	.42	.65	.09	.41	.46	.41	.65
Operating income	1.49	2.93	1.82	3.97	.82	4.37	4.39	2.18	7.25	8.66	5.84	9.49	8.11
Operating ratio	90	85	102	140	104	121	125	381	113	82	100	76	112
Bus-miles	35,124	70,371	443,602	226,798	80,596	653,249	1,126,189	108,017	479,303	144,455	806,354	234,107	4,373,191

Note: Deficits are shown in italics. \*From report of committee on bus operation.



requirements. On the other hand, you will have to give these new things a fair chance to see what can be accomplished with bus operation, as you have in most cases done, with the idea of making it financially successful. The motor bus has many fundamental characteristics that make it excellently adapted to fill a public need and ought to enlarge your field of operation, enable you to hold business you otherwise would lose and, properly combined with your railway operation, it should lead to ultimate economy and operation of the entire system.

#### INTERCHANGEABLE UNITS URGED

Standardization of bus design was urged by V. E. Keenan, superintendent bus division, United Electric Railways, Providence, R. I. After referring to the various forms and sizes of screw threads which cause trouble, Mr. Keenan emphasized the advantage of strict interchangeability of parts and of greater accessibility of certain unit arrangements, such as the amidships transmission. The bus operator must be sure that he can get replacements promptly and also of being able to use them once they are received.

By following such a policy of design, Mr. Keenan held, the depreciation of buses can be reduced from the present high rate (averaging 20 per cent annually) to a figure more in line with electric railway practice. The association therefore should appoint a committee on standardization of bus design, the committee to use S. A. E. standards in its work as far as possible.

Standardization as advocated by Mr. Keenan would not mean one type of engine or of any other part, but it would make possible the interchange of different types of parts on a given chassis. A sleeve valve engine could be put in place of a poppet valve, a multiple-plate-disk clutch in place of a single-plate, or bodies could be moved from one make of chassis to another without altering sills and wheel housings, and thus requiring a great deal of work.

L. H. Palmer, general manager United Railways & Electric Company, Baltimore, amplified the report relative to the operation of trackless trolleys on his property by stating that the operating costs for these vehicles were increasing rather than the reverse. He believed that considerable development is necessary before the trolley bus will become a practical transportation vehicle.

In concluding the discussion, Mr. Flickinger, chairman of the committee, maintained that comparison of

operating costs as between buses and rail cars must be made on the basis of cost per seat, in order to give a true picture of the actual results that could reasonably be obtained.

#### TRACKLESS TRANSPORTATION POLICIES

H. B. Flowers, the chairman, presented the report for the committee on trackless transportation. This committee pointed out that the bus is now a business proposition, not a theory. The same social and economic forces which have already caused the adoption of auxiliary bus service by ninety-five electric railways in this country will continue to expand their use in the future.

This constantly growing use of the bus gives the association a direct and vital interest in the questions of special taxation and traffic regulations affecting motor vehicles in general. In this connection co-operative action with the automotive vehicle associations is desirable.

Another feature of interest to the association is the provisions of state laws and the attitude of state commissioners as to the regulation of competition with electric railways or the operation of buses by electric railways.

#### COSTS OF HIGHWAYS

Information collected by the committee on cost of construction and maintenance of highways for motor vehicles was presented by W. J. Harvie, chairman. This indicated that many states have not kept authentic records of the cost of construction or maintenance of their improved state highways and there was practically no record of costs in connection with county highways.

The conclusions of the committee were: That there now is a noticeable absence of accurate data on highway costs; that there is need of definite action on the part of the several states to obtain accurate cost data on the various types of road in use, in order that an equitable plan of taxation may be devised to meet the expense incurred through the increasing use of highways by motor vehicles.

#### MOTOR VEHICLE REGULATORY LAWS

The committee report on motor vehicle laws was presented by C. D. Cass, chairman. This report indicated that forty-five state legislatures met last winter and that twenty-two of them passed some regulatory measure covering the operation of motor buses on public highways. Iowa and Oklahoma passed full and complete regulatory laws. Others merely amended their present laws. Thirty-six states, an increase of seventeen during the year, now have a gasoline tax ranging from 1 to 3 cents per gallon. In seven states no attempt was made to pass legislation affecting the motor carriers, while in six states legislation failed.

In general, the committee found, the

plans of taxation remain chaotic, unscientific and unremunerative. As a rule the taxes in all states are much lower probably than the cost of maintaining highways damaged by motor vehicle common carriers. Until this situation has been corrected the public will be subsidizing the operation of these new transportation units.

The committee holds that there are a few fundamental ideas that must be secured in new laws in order that regulation may be effective.

1. Certificates of convenience and necessity, making it unlawful for any motor vehicle common carrier to operate or commence operation until some state authority has consented to the operation of a common carrier by motor vehicle.

2. Sufficient power lodged in some department of the state to supervise and regulate the rates, service, accounts, and safety of operations of every motor vehicle common carrier.

3. Adequate insurance to protect passengers and public from injuries and damages caused by the operation of motor carriers.

4. A compensatory tax which will produce such an amount as will repair the damage done to highways by motor vehicle common carriers.

#### CLASSIFICATION OF ACCOUNTS

The Accountants' Association approved a tentative basic, and not too elaborate, classification of operating expenses and revenues for motor bus operation. This classification, which is divided into five primary expense and two revenue accounts, has thirty-seven sub-accounts and follows closely the general scheme as prescribed in the classification for electric railway operations. In its preparation, however, the committee on a standard classification of accounts made use of the motor bus classifications in use by state commissioners, as well as those used by the larger motor bus operating companies such as the Fifth Avenue Coach Company, New York. For profit and loss accounts, for classification of balance sheet and for road and equipment accounts, the committee recommends that the accounts prescribed for railway operations be followed.

#### *Classification of Accounts for Automotive Transportation Companies*

##### Operating Expenses

##### MAINTENANCE PLANT AND EQUIPMENT

**B 1—Superintendence of Plant and Equipment.** This account shall include salaries and office, traveling, and other expenses of those directly in charge of maintenance of plant and equipment.

**B 24—Buildings, Fixtures and Grounds.** This account shall include the cost of labor and material used in repairing garages, shops, stations, waiting rooms, platforms and other buildings and structures, and repairs to buildings and structures held on long term lease.

**B 30—Passenger Motor Buses.** This account shall include the cost of labor and material used in repairing passenger motor buses as follows:

**A—PAINTING AND VARNISHING.** This account shall include all labor and material of whatsoever nature used, whether at regular painting period or touching up renewed parts.

**B—BODIES.** This account shall include all repairs to the body, including labor and material such as glass, doors, roofs, side



sheathings, heaters, window cleaner, lighting wire and all lamp fixtures, and all interior repairs to seats and floor.

**C—CHASSIS.** This account shall include labor and material used in repairs to the chassis, which consists of the frame on which the body and motors are mounted, including springs, brakes, drive shafts, fenders, mud guards, bumpers, headlight brackets, the air spring and air brake equipment, repairs to wheels, brake drums, axles, front and rear brake shoes, brake linings, ball bearings, roller bearings, differential steering knuckles, tension rods, tie rods and equalizers.

**D—TIRE RENEWALS.** This account shall include the cost of all renewals and repairs of tires and tubes.

**E—ENGINES.** This account shall include all repairs, labor and material used in repairing the engine, including all parts thereof together with transmission system, ignition system, including magneto and distributor, gas tank, gas line, carburetor, and vacuum tank, radiator, manifold, fan and belts, and all cooling devices, water pumps, etc.

**F—STORAGE BATTERIES.** This account shall include all repairs and renewals to storage batteries.

**G 31—Freight, Express and Mail Trucks.** This account shall include the cost of labor and material used in repairing freight express and mail trucks, and may be subdivided the same as account B 29.

**B 32—Service Trucks.** This account shall include the cost of labor and material used in repairing service trucks, and may be subdivided the same as account B 29.

**B 36—Shop Equipment.** This account shall include all labor and material used in repairs to shop driven tools, saws, air pumps, battery charging equipment, lathes, etc.

**B 37—Shop Expenses.** This account shall include the cost of repairs and renewals to shop driven tools, air compressor, waste oil, and the expense of keeping the shop clean.

**B 39—Miscellaneous Equipment Expenses.** This account shall include all repairs, renewals, and maintenance of miscellaneous equipment which are not properly chargeable to other equipment accounts.

**B 40—Depreciation of Equipment.** This account shall include amortization charges, representing depreciation of equipment.

**B 41—Equipment Retired.** This account shall include the original cost (estimated if not known) or record value of equipment abandoned, destroyed, sold or otherwise retired from service, less salvage and less proceeds for depreciation on such equipment to date of retirement.

## POWER

**B 53—Power.** This account shall include the cost of gasoline and other fuel used for generating power.

## TRANSPORTATION

**B 63—Superintendence of Transportation.** This account shall include the salaries and the office, traveling, and other expenses of those directly in charge of transportation.

**B 64—Motor Bus Operators.** This account shall include the wages of conductors, chauffeurs, and others engaged in passenger service, including wages paid for time during which they are required to be on duty and to hold themselves in readiness for active service.

**B 65—Freight, Express and Mail Truck Operators.** This account shall include the wages of employees engaged in operating freight, express and mail trucks.

**B 66—Miscellaneous Service Employees.** This account shall include the wages of employees engaged in operation when not provided for elsewhere.

**B 67—Miscellaneous Motor Bus Service Expenses.**

**A—LUBRICATION.** This account shall include all oils and greases of whatsoever nature, used in the lubrication of motor buses.

**B—OTHER MISCELLANEOUS.** This account shall include lamps used in illumination of buses, all material used in cleaning buses such as brooms, fountain brushes, floor brushes, whisk brooms, pumice stone, kerosene, alcohol, non-freeze compound for radiator, skid chains and repairs thereto.

**B 68—Station Employees.** This account shall include the wages of all station employees including agents, janitors, porters, watchmen, and all employees at warehouses and freight houses.

**B 69—Station Expenses.** This account shall include the cost of heating and lighting the waiting rooms, freight houses and other station buildings; rent, repairing furniture, etc.

**B 70—Garage Employees.** This account

shall include the cost of wages and expenses of all employees engaged in sweeping and cleaning the garages, in order to be ready for the business in order to be ready for the business.

**B 71—Garage Expenses.** This account shall include the cost of fuel, light, water, and other garage expenses and expenses.

**B 75—Loss and Damage.** This account shall include the expenses incurred for loss or damage and destruction of tools, fixtures, and other belongings, including loss of tools, fixtures, and other belongings.

**B 78—Other Transportation Expense.**

This account shall include all wages, salaries, and other expenses of employees engaged in transportation, including those engaged in operating motor buses, freight trucks, and other vehicles, and those engaged in other transportation.

## TRAFFIC

**B 79—Superintendence and Solicitation.** This account shall include the salaries and the office, traveling, and other expenses of those directly in charge of traffic, including those engaged in soliciting business, and those engaged in other traffic.

**B 80—Advertising.** This account shall include the cost of all advertising, including the cost of printing, the cost of the advertising material, and the cost of the advertising agency, and the cost of the advertising campaign.

## GENERAL AND MISCELLANEOUS

**B 83—General Office Salaries and Expenses.** This account shall include the salaries and the office, traveling, and other expenses of those engaged in general office work, including those engaged in the general management of the business, and those engaged in other general office work.

**B 86—Law Expenses.** This account shall include the cost of all legal services, including the cost of the lawyer, the cost of the legal fees, and the cost of the legal expenses.

**B 89—Miscellaneous General Expenses.** This account shall include the cost of all miscellaneous general expenses, including the cost of the general management of the business, and the cost of the general expenses.

**B 92—Injuries and Damages.** This account shall include the cost of all injuries and damages, including the cost of the medical expenses, the cost of the legal expenses, and the cost of the damages.

# Does Rubber Endanger the Rails?\*

Co-ordination of Trolley and Bus in the Field of Mass Transportation Is Urged  
—More Than 1,000 Buses Are Now Being Operated by Railways in Auxiliary Service

BY ALFRED REEVES

General Manager, National Automobile Club

**MY THOUGHT** is to draw a picture of the future—a picture which, it seems to me, will have to be realized if the American public is to enjoy the transportation to which it is entitled, and purveyors of transportation receive the reward which should go to those who properly perform a service so vitally necessary as the street transportation of America's ever-increasing and ever-restless population.

It seems proper to mention that the automobile industry, and those who use its products are probably the biggest taxpayers in this country.

Last year we paid \$114,000,000 to the federal government in excise taxes, while annually we pay not less than \$215,000,000 to the state in registration fees, personal property taxes and gasoline taxes (the latter now effective in thirty-seven states) with \$6,000,000 more in wheel and privilege taxes, or a total of \$335,000,000, which will probably climb to a total of \$400,000,000 in 1923.

\*Abstract of an address before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-12, 1923.

John E. Wacker, former tax adviser to the United States Treasury, states that of the \$9,000,000,000 total tax burden of country, state and nation in 1921, more than \$700,000,000, or 8 per cent, came from taxes levied against transportation, motor, steam and electric.

Few will deny that the trolley supplies the best form for mass transportation. It is generally agreed that transportation in big cities can best be served by monopoly, provided that monopoly is not abused, not over-capitalized, and is properly regulated by state authorities.

Unfortunately, monopoly in transportation in the past has been abused and the public has resented it. The newspapers gained circulation and politicians have gained popularity by shouting about it.

Our industry appreciates the hardships of the electric lines. There has been legislation far beyond what seemed necessary. There has been taxation almost to the confiscation point. There have been rulings that were almost impossible to obey. During the past five years, you have also been faced with a new form of transportation, which has

in some cases added to your income by increasing the number of passengers traveling, but at other times has undoubtedly cut into your earnings to a substantial degree.

Low cost has not always been the answer, because the average American is ever ready to pay extra to save time and secure comforts. This is shown by the 10-cent fare paid by 55,000,000 people last year who patronized the Fifth Avenue bus service in New York. The public, I am sure, will gladly pay 8 or 10 cents for a special bus service even when the trolley fare is 5 cents, and it should be willing to pay extra where buses and trolleys are on a transfer basis.

The private passenger car, operated by its owner on the roads which he builds and pays to maintain, is with us now to the number of almost 11,500,000.

#### COMBINATION OF TROLLEY AND BUS ADVOCATED

Two questions present themselves:

1. If the buses had come first, how many of them could now be supplanted by trolley cars?

2. Does rubber endanger the rails?

The bus is a member of the transportation family, born of an emergency and certain to grow into a lusty youngster. It should be adopted as an ally of the trolley, which we shall always have, because the electric lines are still the best forms for use in handling mass transportation.

With the present congestion of traffic and concentration of population, the trolleys cannot properly handle all street transportation. They cannot afford to build in sparsely-settled territories. Nor can the bus do it alone. Think how many would be required to supplant the trolleys which last year carried 15,000,000,000 passengers, which was 15,000,000 more than in 1921. A combination of trolley and bus seems to be the real answer.

In some instances it seems best for bus lines to be run independently, but in a broad sense it has appeared to us in the bus industry, that as experts the trolley people had a rare opportunity to enter the bus field and thus give the public complete transportation.

It is doubtful if the public will support bus lines conducted on a trolley basis. While not always possible to realize, the aim should be to give a bus seat to every passenger. This has been done successfully in New York, Detroit and Chicago, and we feel it can be done in other cities.

The public wants quick, safe, comfortable and economic transportation and cares not about the medium. Given the service, it will gladly pay a proper fare. The trolley company's interest in transportation lies in protecting its capital investment, securing new capital, caring for depreciation, returning proper dividends on securities, covering its general expenses, paying taxes and in meeting charges for paving between the tracks. The bus operator's requirements are about the same except as to

the paving charges, but these are offset by registration fees, fuel taxes, and special impositions of one kind or another.

In certain fields of street transportation the trolley is supreme in efficiency and economy. In others the bus holds a similar position. This demands that the two forms be co-ordinated. The prime consideration, therefore, is to fix the fields of endeavor which each shall enjoy.

Many people have not appreciated that you trolley men have been taking the bus into your arms in order to round out a proper service for your communities. They express the fear that if you take over the buses, it will be for the sole purpose of bringing about their elimination. This is the one belief which the electric railway interests in this country must change if their entrance into this new field is to receive a proper welcome.

Service and not price is the real answer to transportation. The public is growing to believe that the trolley companies should manage the others, rather than irresponsible operators. But I fear they will patronize the so-called irresponsible operator if he succeeds in winning their favor by a sincere effort to give service at a low rate. By hesitating, trolley men have missed some golden opportunities, although it is not too late if they will enter the field in the proper spirit.

Most statements of electric railway men seem to hail with delight the inability of bus lines to score 100 per cent, when at short notice they have been installed in place of trolleys. I hear the difficulties of Bridgeport, Saginaw, Des Moines, and other cities; but, gentlemen, those operations were only growing pains and only partially indicated what can be done with buses. Most of these operations could not be considered conclusive measures of bus efficiency, because they were emergencies and lacked time for proper organization.

#### RIGHTS OF THOSE NOW IN FIELD SHOULD BE PROTECTED

May I emphasize another point?

We believe that the power of the trolleys to acquire, own and operate buses, should be exercised largely in new fields. It hardly seems equitable, except where there has been illegal or unjust competition, that they should be allowed to destroy bus transportation in the hands of others. In all cases where men have taken the risk in order to build up a bus transportation business, equity demands that they be permitted to retain that business if it is not adverse to public welfare, or that there be paid for the business a sum which is not measured by the sum of the second-hand value of the equipment, but the value of a going concern which pioneered a development that has proved of benefit to the public.

One could give a long list of happenings in this country of late that shows the tendency toward bus transportation. The most outstanding feature, of course, had to do with the operations in Newark

during the recent trolley strike, where some 11,000,000 passengers were carried during August by the bus lines.

One of the largest bus operations by an electric railway is that at Milwaukee, Wis., where more than seventy-two buses are now in service. Wilkes-Barre, Pa., has bus service of from sixty to seventy-five units, handling approximately 4,000,000 passengers annually.

#### WEST COAST HAS 100 INTERCITY BUSES

The most noteworthy move by one company is the action of the Pacific Electric Railway and the Los Angeles Railway Corporation at Los Angeles and Pasadena, Cal.

After a survey of the operations of other electric lines and the independent bus transport service being given in all parts of the country, these two companies jointly have secured a long-term franchise for bus operation in these two cities and have placed an initial order for almost 100 buses of the twenty-five-passenger type, and their investment in equipment, garages, etc., will total approximately \$1,000,000 immediately, with every prospect that this will be doubled before the end of this year.

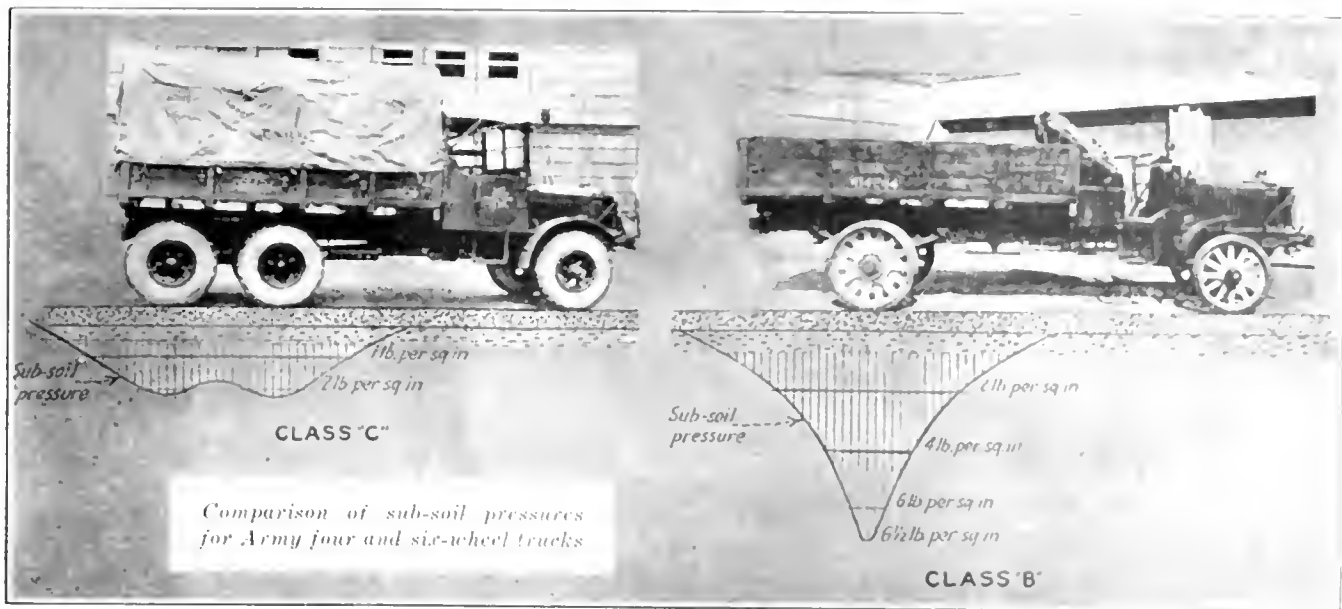
At Baltimore the United Railways & Electric Company has been operating buses for several years, and has extended its service within the past year. At Newburgh, N. Y., and at Everett, Wash., the electric railway lines have abandoned their electric service and taken up bus operation instead. At Youngstown, Ohio, the Pennsylvania-Ohio Company now has an installation of buses totaling thirty-one, of which about one-half are of the de luxe type. Since inaugurating this service, about a year ago, the traffic on the lines, combined bus and electric service, between Warren and Youngstown, 15 miles, has increased 33½ per cent.

We are not yet sure of the proper types for the various kinds of bus service. Some bodies have been built entirely too wide and without respect for the rights of others on the highway.

We feel our industry is in accord with yours, so far as it relates to state supervision of common carriers. More than two years ago, we declared that control over motor vehicle common carriers, if deemed necessary, should be placed in existing state commissions and that as a prerequisite to operation the owner should be obliged to obtain a certificate of public convenience with the proviso that lines in actual operation shall prima facie be regarded as necessary.

Our declaration called for liability insurance, with special or extra fees utilized for highway maintenance, and advocating legislation to enable steam railroads and trolleys to own and operate the motor vehicle in conjunction with their regular line of business.

My faith in the good sense of American business men, together with your kindly reception of a representative of the automobile industry, leads me to believe that this meeting marks a new era in local transportation in this country.



## Some Confessions of a Six-Wheeler

Details of Army Truck Performance—Flexibility Shown  
on Rough Ground—Pressures on Highway Lessened—  
Four-Wheel Brakes Used, but None on Front Wheels

**M**ANY bus operators are wondering what happens when a motor vehicle is mounted on six wheels instead of the conventional four. Just what does the six-wheeler do, in turning a curve, in stopping, in taking bumps or obstructions? What is its effect on the highway? How is the vehicle put together to satisfy such operating requirements as are handled by a single axle with its Hotchkiss drive or radius rods?

The answers to these important questions are furnished by the illustrations in this article, these coming from the Quartermaster Corps motor headquarters of the United States Army at Camp Holabird, Baltimore. These picture "confessions" represent the Class C truck, now being tried out experimentally by the Motor Transport Division of the Quartermaster Corps, under the supervision of A. W. Herrington, chief engineer. The important features of its construction will be described later in this article, but first let us examine the illustrations. These gain interest when it is remembered that one bus operator in California has built and is running six-wheeled vehicles.\*

First, notice the photograph taken when running on irregular ground.

The wheel at the extreme rear is raised above its mate on the opposite side and also above the one in front on the same side. This is the extreme condition, of course, and tests have shown that blocks 1 ft. high can be placed under the diagonally opposite wheels of the rear quartet without binding or interference. The road conditions in the photograph of course lead to this same blocking up of diagonal wheels.

It is often asked, will not a six-wheeler give trouble at the rear on rounding curves? A photograph and a drawing are presented to cover this point. In turning on the sharpest

curve the effect is to warp the treads of the rear tires slightly. This is indicated in the photograph by the wider marks left by the rear tires, which warp or deflect in an opposite direction on the wheels in tandem. It is understood that the  $\frac{1}{2}$ -in. warp, as shown in the steering diagram, is within the limit allowed in designing the tire. The tire is built to stand up under this service in ordinary operation, and of course the condition represented here is the worst that could be obtained from the six-wheeler.

To determine what happens to the highway, it was necessary to make



*Like footprints in the sands of time, taken of six-wheeler turning a 68-ft. circle*

\*See BUS TRANSPORTATION, June, 1923, page 265.

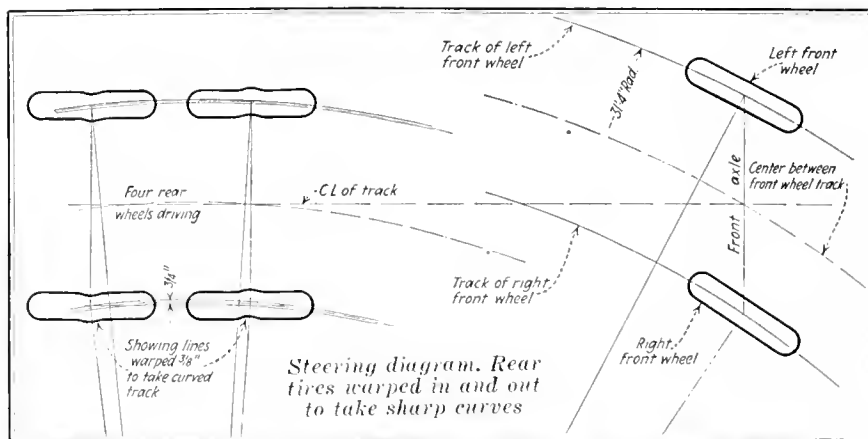
comparative tests. Sub-soil pressures are shown for two types of vehicles, the six-wheeler and a four-wheel truck. During the test each carried a load of 10,000 lb. and the vehicle weight was about the same. Underneath each vehicle is shown the sub-soil pressure due to the rear wheels, as registered by the delicate instruments of the Bureau of Roads. The effect of the four wheels on the rear is shown by a pressure of only about 2 lb. per square inch, while on the other vehicle it goes up to  $6\frac{1}{2}$  lb. underneath the axle.

Impact tests were made with these two vehicles and also with a pair of 2-ton trucks. They were driven at  $17\frac{1}{2}$  m.p.h., and the impact was measured with a 2-in. obstruction. The chart given shows that this impact value was much less with the six-wheeler, even with its  $8\frac{3}{4}$ -ton payload, than with the others. The 5-ton pneumatic carried 6 tons, while the 5-ton solid and the two 2-ton vehicles carried their rated payload.

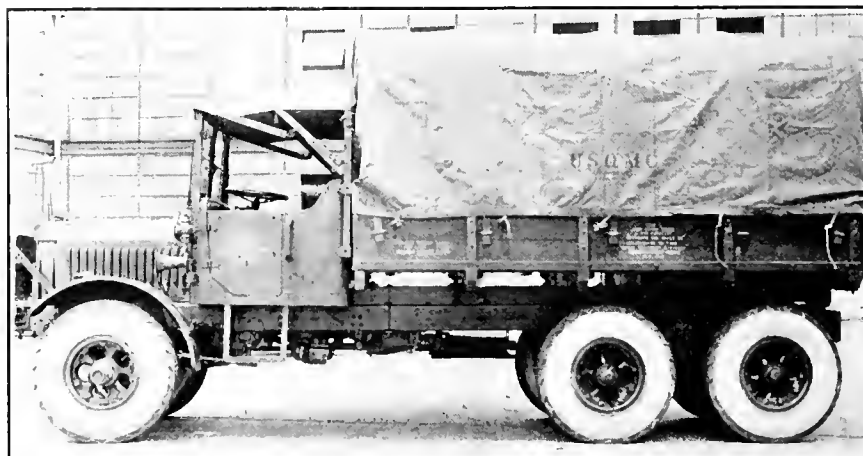
Four-wheel brakes are used on the six-wheeler, but not of the type usually so described. The brakes are on the four rear wheels, and there are none on the two at the front. With these brakes, however, a stopping performance of 19 ft. per second per second has been obtained. This means that at 20 m.p.h. the six-wheeler is stopped in about 25 ft., which is half the distance required to stop a pleasure car with ordinary rear-wheel brakes. The six-wheeler, therefore, gives practically the same performance as four-wheel brakes of the conventional type with one set on the front. The stop can be made without discomfort too, since the stop is made gradually.

#### REAR AXLES IN TANDEM

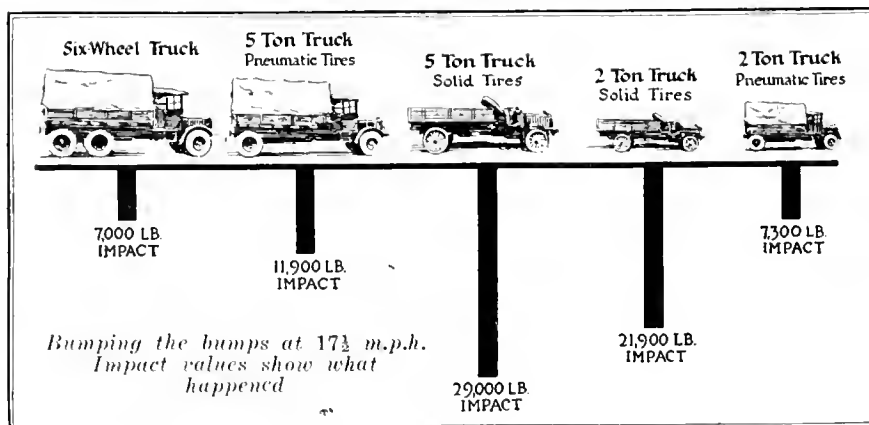
It will be noticed that the rear axles are in tandem, the drive being from the front through one axle and then through a short shaft to the second axle. The springs are mounted on the end of each axle and are carried at the middle on a cross shaft attached to the frame. Thus the springs can swivel back and forth on this shaft when road obstructions are alike under each side of the vehicle. On account of the flexibility of the springs the wheels diagonally opposite can move also, because outside of the springs themselves the only connection between the two axles is through the heavy torque tube shown at the right. (On a worm-driven six-wheeler now being developed at Camp Holabird, the

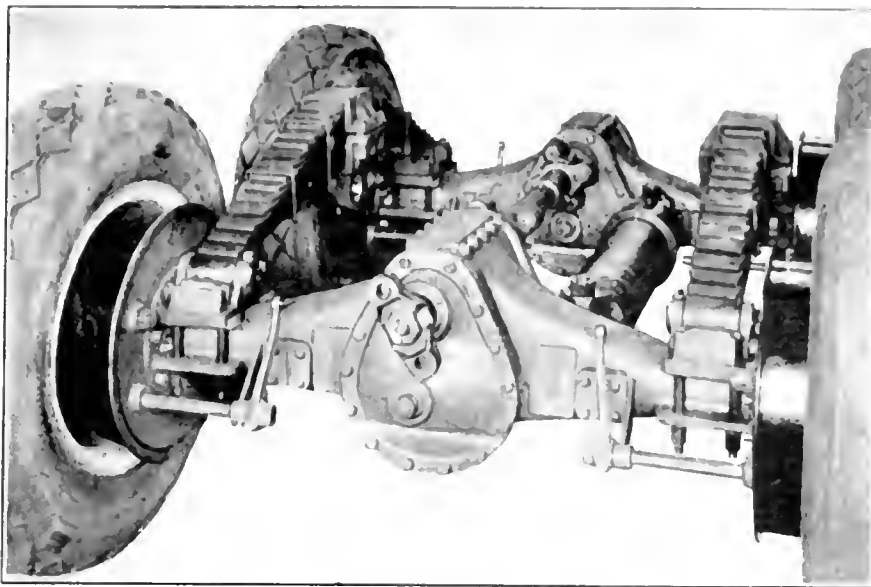


*Ground here slopes in two directions, and is navigated!*



*Built by Motor Transport Division, Q. M. C., United States Army*





*Looking from the front, with double-reduction axles separated by torque tube*

torque mechanism will be mounted directly in the center and under the drive shafts.) This keeps the axles a fixed distance apart, but does not hold them parallel. With this arrangement the drive is taken through the springs as in the Hotchkiss method, whereas the torque which would tend to turn the housings of the axles is balanced by the tube. The load, of course, is carried directly through the springs to axles.

The Class C army truck shown here is built to develop both speed and power. On good roads it can make almost 50 m.p.h. In addition to the four-speed transmission the truck has a second gear change with two speeds, one being direct and the other a 1.63 to 1 reduction. With the latter a total reduction from engine to rear road wheels of 66.5 can be secured, thus permitting operation on bad roads and over soft ground. This six-wheeler can therefore do most of the work for which a four-wheel drive truck would ordinarily be required, with the exception, of course, of conditions where the rear wheels can get absolutely no traction so that the drive must be taken for the time being on the front. Unloaded, the six-wheel truck weighs 11,500 lb. The nominal wheelbase from center of front axle to center point of spring support is 170 in., while the rear axles are set 50 in. apart. Wheel gages are 67 and 64½ in. for front and rear axles respectively. The tires are 38x9 heavy duty pneumatic.

Two complete sets of brakes are used, of the internal type inclosed in drums. Each wheel contains four

shoes, two for the emergency and two for the service brake. These can be adjusted from the outside by bolts on the camshaft levers. An interesting arrangement has been worked out to equalize these brakes. Equalizer bars are connected to a pair of tubes, one telescoped inside the other. From these tubes the rear rods lead back to the two sets of brake camshafts, connections being made to double levers above and below the tube centers so that movement of driver's lever or pedal applies brakes on both axles.

### Lectures on Highway Transport

THE University of Michigan announces a series of lectures on highway transport, which will be given from December, 1923, to March, 1924, at Ann Arbor, Mich. These lectures form part of short period courses, so called, which require attendance at the university for two weeks.

Highway construction as well as the general subject of highway transport will be considered. Under the latter will be taken up American and English highway transport methods, inter-relationship of highway, railway and waterway transport, legislation and traffic regulations and record systems for highway transport operators.

Full details regarding the various courses can be obtained from A. H. Blanchard, professor of highway engineering and highway transport, University of Michigan, Ann Arbor, Mich.

### One Way to Meet Unfair Competition

AFTER building up a successful business, the Reynolds Taxi Company, Clarkburg, W. Va., operating a bus line from there to West Milford, was nearly crowded to the wall by a competitor.

Mr. Reynolds had gone through all the hard hip of the pioneer, driving over bad roads and making long detours.

At last, when he had made the acquaintance of practically all the people living along his route and he was in a position to make a fair profit on the business, another fellow with a car appeared and was slowly cutting in on his hard-earned profits.

The usual method in West Virginia is to take it up with the State Roads Commission. This he considered, but it meant a loss of his time and considerable expense for an attorney.

After mature deliberation he had some cards printed, about 8 x 12, with the following: "Reynolds Taxi, stop on next trip."

These cards were distributed all along the line and the patrons were asked to hang them on the front porch in a conspicuous place where Mr. Reynolds could see them whenever they wanted to go to town.

The patrons used the cards and they had the desired result.

First, the patrons were making it easy for themselves and did not have to stand outside and wait for him to come along. When he did come he tooted his horn and they came out. It also declared that they wanted to ride with him and that they would wait for him. This prevented the other fellow from picking them up, even if they had been waiting outside.

### No Buses in Alaska Yet, Says Governor Bone

ALTHOUGH there are about 100 passenger motor cars and an equal number of motor trucks now operating in Alaska, there are no motor bus passenger lines there, according to Scott C. Bone, governor of the territory.

There is a great need, the governor says, for motor buses in the canning districts, where in the summer season passenger cars make regular trips for the benefit of employees, and there is a place for the motor bus in the future of Alaska's transportation systems.

# BUS TRANSPORTATION

Published by McGraw-Hill Company, Inc.

CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, November, 1923

## A Convention Dividend

**M**ODERN conventions, at least as held by many big organizations, are grand affairs. Banquets and parties, exhibits and demonstrations, meetings and conferences—all these come so fast that the innocent onlooker, meaning the individual seeking a due balance of profit and pleasure for the good of his particular business, is likely to wonder just why he was there and what he got out of it.

If there are any who had such a feeling after last month's convention of the American Electric Railway Convention they should straightway read the report which appears elsewhere in this issue.

Every bus man, every follower and well wisher of the bus industry, will find here the vital proceedings, digested, condensed, all the essentials and nothing else, of the various meetings and conferences. Here is represented a real dividend of the convention investment.

Representatives of the automotive and railway industries were in attendance to discuss what seemed to them the future of the bus. Committee reports were rich in real experience, the best guide to effective transportation. Principles of motor vehicle taxation and requirements for highway construction were duly considered. The latest examples of the art in chassis and body equipment were on view at the Exhibition Hall.

In the present issue all this valuable material, the concentrated wisdom resulting from generations of transportation experience and the highly diversified operation of buses, is laid before the subscribers of *BUS TRANSPORTATION*.

Read it and profit!

—[ EDITORIAL ]—

## Facts First, Then Fair Taxes

**D**URING the present year the different states have completed hundreds of miles of hard surfaced highways, at a cost of millions of dollars. Still the demand for improved roads grows. Is it any wonder that some keen and experienced business men begin to question the advisability of the continuation of this great expenditure of public funds?

As yet few of those interested in the increase of improved highways have sensed this questioning. Sooner or later, however, it must be answered by facts. Generalities will not be tolerated when the time comes to justify further construction. The only argument that will count will be facts. Facts to prove that a sufficient return is being earned on the investment. Facts to show that interest payments can be made as they fall due. And facts that indicate a sinking fund is being set aside to retire construction bonds at maturity.

Very few facts have yet been assembled as to costs of construction and maintenance of highways under different load characteristics. Few states have correct figures for these costs. The counties and other smaller governmental divisions have practically none at all covering their highway work. Neither has any great amount of information been collected to show decreased cost of operating motor vehicles on hard-surfaced highways. Surely there is a considerable decrease in gasoline consumption, tire and maintenance costs, when operation is over improved roads; surely these are much less than over unimproved gravel or water-bound macadam roads.

Improved highways have paid handsome returns in increased property values. To the bus operator this has meant increased traffic and larger gross earnings. Both have profited therefore by the better highways.

The time is at hand when all who have profited by improved highways are likely to be called upon to bear their share of the costs in proportion to the benefits received. Bus operators, individually and through their associations, should assemble facts bearing on their own local conditions, and showing how property owners, as well as all motor vehicle operators, are the gainers from all-year, hard surfaced highways.

—[ EDITORIAL ]—

## Something about Schedules

**V**ERY often it is a small thing that makes a person determine whether he will ride in a bus or travel otherwise. Many operators—perhaps it is a universal custom—have printed schedules for general distribution. These schedules show leaving time of buses from terminal points, and very often at intermediate points, so that a prospective passenger can readily make use of them to determine the length of time it will take to travel by bus.

One thing perhaps more than anything else about these time-tables is their lack of uniformity in size, and the method of presentation used. In some cases the schedules are printed in too small a type face to be easily read, and then in order to get more legibility the trim size of the folder or card is such as to be clumsy and inconvenient to carry.

The cardboard type of schedule, with rounded corners that fits into a man's vest pocket or a lady's pocketbook, seems to be the form of printed timetable that people are most likely to carry. With one of these in pocket, instead of one on soft paper that will crumple easily or on a card that has to be folded up in order to be carried, both of which become



more or less illegible through usage, the bus operator has a great help in building up his business. One additional passenger per trip would make a very effective showing in revenue at the end of a year, and more than pay the cost of printing schedules as well as time and effort put forth to please the public.

[ EDITORIAL ]

### *Why the Popularity of the Bus?*

**W**HEN the nickel fare was established on the trolley lines in the larger New Jersey cities on Oct. 1, many people believed that the competitive bus lines would lose much of their patronage. Buses, however, are still being extremely well patronized. In fact, in Paterson, where the 5-cent fare also applies to the buses, it is reported that more people are riding the buses than at any time heretofore with the exception of the period when there was no trolley car service.

In Jersey City, where the fare is 8 cents cash and free transfer, or a 90-cent weekly pass, the buses are handling capacity loads not only during the rush hours but throughout the greater part of the day.

To a student of transportation this is a curious situation and at first hand it is difficult to find an explanation. One that appears most reasonable is that passengers today, instead of merely investing a nickel in a ride, really invest their time so as to get the greatest return. Thus they choose the bus on account of its curb-loading convenience, its flexibility permitting it to get through vehicular traffic and around breakdowns more quickly. In short, it is not always the fare that gets the traffic.

[ EDITORIAL ]

### *Motorways Offer Possibilities for Expansion of Motor Transport*

**F**ROM London comes news of a very interesting proposal. Plans are said to be on foot for the construction of a motorway from London to Liverpool, with a branch to Oldham, a total length of 226 miles. Regard the matter as fantastic if you wish, but here it is in brief: a toll road 50 ft. wide for the exclusive use of motor vehicles carrying passengers and light goods. Of course, the English proposal is merely an idea as yet. It will be a year even before Parliamentary sanction can be obtained. It will then take two years to complete the work. The promoters, however, appear to have worked out the plan in their own minds to their own satisfaction.

Already there are several pleasure speedways in various parts of the world. There are many branch line railroads in the United States which do not pay, service over which has gradually been growing worse, according to the public's idea, from year to year. The most valuable thing about them that now remains is their right-of-way. With the growing congestion of public roads there would seem to be a possibility that these rights-of-way could much more profitably be devoted to motor highway purposes. In any consideration of the matter of motor transport sight must not be lost of the fact that the motor traffic is here and that the roads will be fitted to the traffic rather than the traffic

to the roads. This would seem to be axiomatic, but the fact is often ignored. More than twenty years ago H. G. Wells in "Anticipations" peered ahead and saw the motorway as a possibility of the future, but to most people the idea, despite the English proposal, will still appear to be a dream. It seems true to say it, but the way of the individual through life has always been eased by the sound application of the idea first conceived by the dreamer. Those inclined to look uncharitably upon the proposal made in England should not forget that the railroad as now operated really started as a steam motorway and that the idea of rail was long an afterthought.

[ EDITORIAL ]

### *Newburgh's Conversion to the Bus Is Rewarded*

**W**HEN a well-maintained electric railway in a town of 33,000 is suddenly scrapped by its owners in favor of a motor bus system, the transportation world rightly inquires with some surprise: "Why did they do it?" The article in the October issue entitled "Newburgh Likes the Bus" tells the story, we believe, from the angle of both the stockholders and the riders.

Newburgh is a very live manufacturing and trading center for a community of its size. For all that, the advance of the personal automobile and the rigidity of track transportation was putting its electric railway into a state of coma. The owners saw nothing ahead of them but a continuation of loss year after year, although they had not failed to keep the equipment in good shape and even to give their base service with new single-truck one-man cars. The only way out was to see if a complete change of transportation method would justify the addition to existing overhead costs. Under the conditions existing at Newburgh this change has successfully justified itself through the one fact that professional railway operators have regarded least, namely, the business creating power of reliability, novelty and accessibility.

Consider what has been accomplished in the first seven months of this year. A rail service with all-day vehicles of thirty-two seats and of supplementary cars with forty seats or more—both with great overload capacity—has been superseded by buses seating only twenty-five and limited to less than 50 per cent comfortable overload. Yet the figures show that without change in speed or headways the buses have carried 22 per cent more patrons; and that they have done it with but 19 per cent more vehicle-miles! Even after allowing for the superior winter reliability of the curb-loading bus, the latter was good in open weather for 10 per cent more patronage than the car. This 10 per cent did not represent an increase in the compulsory peak-load riding so much as in the voluntary, off-peak riding. Shoppers and pleasure seekers rode oftener because they liked the bus better.

It may be that other communities enjoying lower power and other car-operating costs and suffering

a higher proportion of overhead than Newburgh would not fare so well. Let that be granted. The big outstanding fact is that former Governor Odell and his associates had the imagination and courage to give the public what it seemed to want—and that the public has made good with them.

—[ EDITORIAL ]—

## Winter Preparedness

**I**F THERE happens to be any bus operator who is not now set for winter operation, it is time for him to hustle around and get his garage, vehicles, and waiting rooms in shape.

Vehicles in shape means looking out for a number of things. Radiators must be protected, either by anti-freeze solutions or covers, or perhaps both; proper lubricating oil must be on hand; and fuel systems adjusted to low temperature conditions. Arrangements must be made to heat the interior of the bus. Piping, heat control valves, windows, and ventilators should all be put into good working order. Skid chains must be made ready, and plenty of spares provided to take care of breakages.

In both garage and waiting room, heating facilities should be inspected. The equipment for washing must be working right, so that frozen snow or mud can be cleaned off, and will not interfere with operation of brakes, steering control or other essential parts. A heated garage means better work by the mechanics, also buses more comfortable on the road.

It will be a good thing to jack up all along the line, to see that drivers and men in the garage are ready to handle the severe operating work which comes along with snow storms, frozen roads, low temperatures, and in fact any effect peculiar to cold weather.



## Improvement in Garage Storage

LOS ANGELES, CAL., Sept. 24, 1923.

To the Editor:

I am interested in improved methods of efficiently storing or parking vehicles in garages. Has your magazine published anything on the subject? If so, in what issue did the article appear?

F. E. REINHOLD.

[The August issue of BUS TRANSPORTATION (page 375) contained an article discussing the garage-storage problem. Where space is limited and valuable, efficient parking inside the garage must of course be studied thoroughly.]

There is not only the necessity of making the best use of every square inch of floor space, but in many installations a quick start on the first run of the day is important. Drivers should be required to take time at the end of the last trip to back their vehicles into position so that they can be quickly driven out

in the morning, or during a night emergency, too. If they must be handled by maintenance men and moved to another position, then they should be put back in place afterward.

Many operators are marking the floors and thus laying out what is in effect a stall for each vehicle. This helps the driver to get into position quickly and at the same time he does not take up space that belongs to some other vehicle.

Good door space is another means to the desired end. At the big 132d Street garage of the Fifth Avenue Coach Company in New York the doors are wide enough so that three double-deckers can come out abreast. In other installations it may be desirable to use a larger number of doors. Some of these may open out into a side street or to a private roadway.—EDITOR.]

—[ LETTERS TO THE EDITOR ]—

## The Ideal in Bus Design

PONTIAC, MICH., Sept. 15, 1923.

To the Editor:

There is no question in the mind of any person who has given the matter of bus design any serious consideration, that we are yet far from building a real motor bus. Many of our manufacturers do not yet appear to have realized that motor-bus passengers deserve more consideration, or are entitled to privileges not accorded to merchandise from the standpoint of comfort, both mental and physical. Considerable credit is due therefore to those manufacturers who have abandoned the idea that a make-over or partly redesigned truck chassis is suitable for passenger transportation, and have courageously tackled the problem with the single-minded intention of producing a vehicle worthy of the service into which it is to be put.

The question naturally arises: What is required to attain a motor bus that is safe and comfortable for riding?

By far the most important single feature is correct spring design. The requirements of motor-bus springing differ materially from those of a motor truck or a pleasure car, combining the elements of both; it must be capable of giving truck service and capacity with pleasure-car luxury and comfort. Realizing the importance of this, the writer has attempted the design of a spring suspension that would overcome the fundamental defects that exist in present standard types. The efforts put forth have resulted in a design of a spring suspension that is automatically load-compensating, and that has incorporated in the mechanism a rebound check or shock absorber.

The next most important feature for which all designers are striving, is to effect a reduction in the floor height from 35 in. or over, to as low as possible. Different expedients have been tried. Some use an inverted worm drive; others drop axles with internal-drive gears. Another available design is a drop axle, but in place of internal gears, spur gears with herringbone teeth are used; these are inclosed in an oiltight, dustproof housing, and are thus constantly lubricated, insuring quiet operation and reducing wear.

Another asset of the desired motor-bus is silent

operation. There is no more reason for gear noises in a motor bus than in a pleasure car. Silent chain transmissions or constant mesh gears with herringbone teeth will overcome this defect, and remove the objections of many nervous passengers to motor-bus riding.

To be desired also is a smooth-running motor with quick pick-up and getaway. This is exclusively the field for a six or eight-cylinder motor which can be run at continuously higher speeds than the heavy four-cylinder motor now almost universally used.

Summarizing the points of the foregoing analysis, the objects desired are: (1) Improved springing; (2) low rear axle; (3) noiseless transmission, and (4) powerful, economical and smooth-running motors.

There are very few automotive manufacturers who can make their own springs, axles, motors and transmissions; these are very properly left to specialists in their respective fields. This would indicate that the persons who are, or should be, most interested in the development of the bus industry are the parts or accessory manufacturers. They are in a position to manufacture parts for sale to chassis manufacturers, and have more incentive and a wider market for their products than any vehicle manufacturer can possibly have.

E. FRANKLAND.

—[LETTERS TO THE EDITOR]—

### Small City Operation

WEST END DEVELOPMENT & TRADING CO., LIMITED

OTTAWA, ONT., CANADA, Sept. 17, 1923.

To the Editor:

The writer recently heard of a movement in a neighboring town of some 10,000 in population to institute a street railway service. In my opinion, as hauls would be very short, buses would give more economical and efficient service and operation than would electric cars and with about one-quarter the capital outlay. Before making any recommendation I would like to have at hand the experience in towns of similar size, and the purpose of this letter is to ask you if possible to supply me with any helpful information you can.

The town under consideration is an extremely prosperous one and the per capita wealth is very high, considerable manufacturing is done, the roads are well paved and kept, the streets broad. The town borders a river and is approximately 2½ miles long by 1 mile deep—the business and shopping section is centrally located, the railroad station is at the back of the town—four railways enter the town.

After going over the ground I decided that two routes of 1½ miles each in length would take care of any traffic. With five buses in service a six-minute headway could be given. I estimate that six passengers per single trip at a 5-cent fare would be necessary to meet all expenses. The people who would interest themselves in this scheme would be satisfied if the venture could merely meet expenses, as they each have a large stake in the town and would benefit from such a development in other ways.

E. P. TAYLOR.

[Under the conditions mentioned in this letter, bus service would undoubtedly be the most econom-

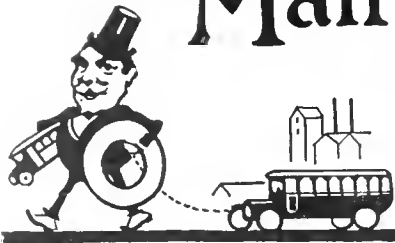
ical form of transportation, assuming, of course, that there would be enough business to make even bus operation profitable. The main question is whether it would be necessary to supply a six-minute headway and five buses. It might be better to try out the proposition a little more conservatively with service every quarter hour. Three buses would then be sufficient, allowing one on each line and a third as a spare. There would be some leeway, also, to shorten the headway night and morning if justified.

In Sanford, Me., La Porte, Ind., and Lakeland, Fla., the records of BUS TRANSPORTATION indicate that local lines are being operated on a 5-cent fare. The three towns compare in size with the one mentioned. Lakeland has 7,000 population, Sanford 10,000; and La Porte, 15,000, according to the 1920 census. Two sixteen-passenger buses are used in Lakeland; one twenty-three-passenger in La Porte; and six vehicles ranging in capacity from seven to sixteen seats, in Sanford. In the last named, however, three or four different lines are worked. Only five trips a day are scheduled, and those between 8 in the morning and 8 at night. The first two give eighteen hours service, with a thirty-minute headway.

Most of the short-line business in small towns is done at higher fares, however. It may be 10 or 15 cents or even 25 cents for a trip of 2 miles or less. In view of this, it seems only fair to conclude that either the riding habit must be well developed, or the walking conditions unusually severe, to justify a 5-cent fare for such light traffic business as might naturally be found in a town of 10,000 inhabitants. And there is often the possibility that it is quicker to walk than wait for the bus.

Taxi competition must also be given due consideration, since the operators of "call-and-demand" vehicles, in small towns, often run what is, in effect, a bus service. That is, they make connections with trains or other points where traffic is likely to be found at regular times, and then fill up all the seats, often making a price concession. Even when they do not lower the price for a full load, they are likely to carry passengers anywhere in the town for 25 cents. This is hardly enough more than the bus fare to draw business for the latter. Many people would pay the extra 20 cents to ride when they want to, rather than wait for the bus. The six-minute headway might take care of this business, of course, but it would hardly pay with one or two passengers on many trips, or none at all, as would undoubtedly prove the case with such frequent service.

Since the above letter was received the results of the first month's operation of buses in Brattleboro, Vt., a city of 7,325 population, where the street railway system has been supplanted entirely with buses, has been made available. This is given in considerable detail on page 550 of this issue. The report indicates that a greater amount of "traffic" was handled by the buses during the month than on the trolleys in the corresponding month of the previous year. The operating officials are gratified at the results obtained.—EDITOR.

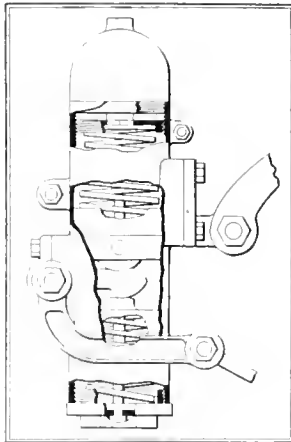


# Manufacturers' Section

Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Auxiliary Springs Take Up Shocks

THE Lomar Manufacturing Company, Middletown, Ohio, has recently applied shock absorbers to bus service, as indicated in the view of the Model 50 White Chassis. Here the absorbers are placed on the front end only, since most of the vibration is found there on buses. The installation requires no cutting or altering

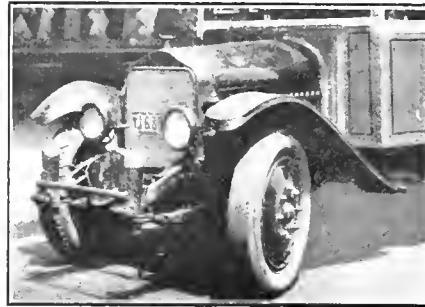


*Cut-open view of Lomar shock absorber arranged for mounting in front of chassis*

of the frame, since the device when installed at the front is simply bolted between the spring eyes and the front of the frame.

As shown in the cut-open view, the frame members are attached to the outside of the shock absorber, while the spring eyes are fastened to a lever arm connected in turn to a cam placed between the two helical-type springs. This construction, it is said, overcomes any tendency of a quick jerky motion being transmitted to the frame and thus to the body of the vehicle.

Both the upper and lower springs are carried inside pistons. These cover the two springs and so at the same time provide bearing surfaces for the moving cam, as shown here in the cross-sectional drawing. The spring at the top, which is the larger



*Lomar absorbers on Model 50 White chassis. Notice protection afforded by heavy crossbar*

and heavier of the two, is designed to absorb the impact shock transmitted from the road. It can be adjusted to the right tension to suit the weight of the vehicle. The lower spring snubs and absorbs the rebound of the main semi-elliptical spring on the vehicle, thus allowing the vehicle to settle slowly and easily with comfort for the passenger.

Lubrication for the moving parts is furnished by an oil fountain arrangement, consisting of a pipe extending from the bottom of the absorber up through the lower spring. The motion of this spring forces a stream of oil up the pipe and sprays it over the working parts. A half pint of oil in six months is said to be sufficient to keep the absorber lubricated.

## Aluminum Panel Body Seats Twenty-eight Passengers

THE Kastory Manufacturing Company, LaGrange, Ill., is manufacturing the Avondale type bus body shown in the illustration. This has accommodations for twenty-eight passengers, there being five 32-in. seats on each side of the central aisle. The rear seat extends the entire width across, and there are two individual seats, one right and one left at the front. Two doors are provided, a jackknife type for regular service and an emergency door on the left side at the rear. Each seat has a push button for a signal device.

All the up-to-date conveniences are included in the body construction, six dome lights in the ceiling, ventilators above windshield and on each side in the rear, and a pipe-heating system covered to insure safety to passengers.

Inside trim includes a flat cream finish on the ceiling, with the lower part in mahogany. Seats, cushions and backs are finished in Spanish imitation leather, stuffed with No. 1 curled hair. An 11-in. rack for advertising cards covers the entire length of each side of the body. Above the windshield is a concealed compartment for a destination sign.

Of storage compartments there are four, for tools in the lower right-hand side, for battery box on the left side of the body, a compartment in the rear for a spare tire and a baggage compartment under the rear seat. The last has a hinged door which opens from the outside.

The side windows are of the drop type, with brass rods as safety guards outside. Cathedral glass is



*Cathedral glass above all windows sets off this twenty-eight passenger body (Kastory Manufacturing Company)*

used at the top of all windows, both for the drop type and the stationary construction. There is one fixed window at the left side of the driver and two at the rear of the body.

The general construction is of the wood frame type with panels of 14-gage aluminum. A half-inch space is left between body and dash, the latter being entirely loose from the body. The ceiling is 1-in three-ply veneer, made in sections with felt padding glued underneath.

### Four-Wheel Brakes Feature New Bus

**T**HE sixteen-passenger bus shown in the illustrations consists of a chassis built by the Menominee Motor Truck Company, Clintonville, Wis., and a de luxe sedan body made by the Niagara Motor Boat Company, North Tonawanda, N. Y. The engine is a six-cylinder Wisconsin of the valve-in-head type, said to be remarkably flexible and to give good acceleration. Cylinders are 3½-in. bore and 5-in. stroke and the engine gives 57 hp. at 2,000 r.p.m.

The cellular radiator has thermostatic control, water being circulated by a centrifugal pump. Fuel is supplied from a 23-gal. tank to the Zenith carburetor through a Stewart vacuum system. The three-speed transmission is mounted in a unit with the engine, as is also the multiple-disk clutch.

Four wheel brakes are used on aluminum disk wheels. Service brake is connected to internal expanding shoes on front and rear wheels, while the emergency system controls external brakes on rear wheels only. Another feature is the doughnut tires, 32 x 6 in. pneumatic.

Bosch electric starting and lighting and Willard storage battery, of



*Menominee four-wheel brake chassis with Niagara sedan-type body*

150 amp.-hr. capacity, are supplied. Three Pioneer exhaust heaters are fitted under the seats.

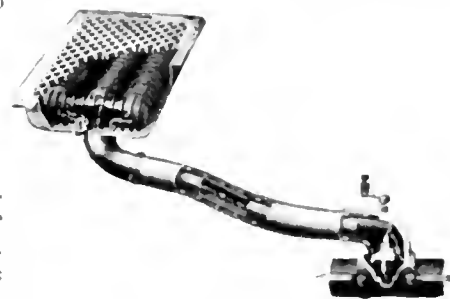
On a recent 1,000-mile trip this Model "T" bus averaged about 12 miles per gallon of fuel and 400 miles for each quart of oil consumed. The normal speed is given as from 35 to 38 miles per hour.

### Cast Element Used in Floor Heater

**T**HE Noble Heater Company, Fort Wayne, Ind., is making the floor heater shown in the illustration. Known as the Wayne Model B, this has a cast heating element so arranged that gases from the exhaust must pass through the entire heater before returning to the muffler. With this construction, it is said, the maximum heat is secured at all points in the heating element. The valve for the heater is installed on the exhaust pipe forward of the muffler. It is self-cleaning and directs practically

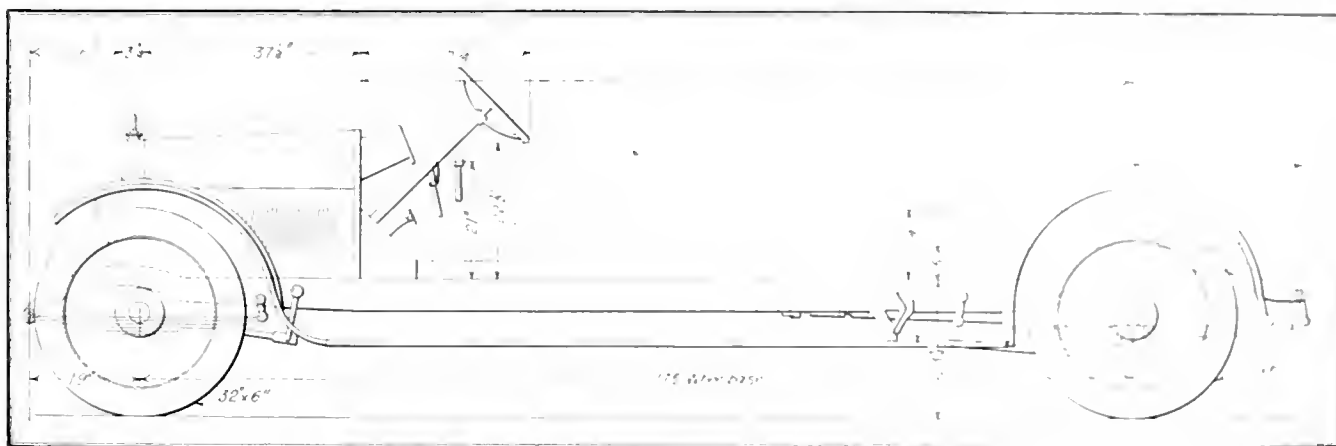
the entire flow of gas to the heater. The foot control for this valve can be placed in any convenient position on the floor of the vehicle.

The cross-section view of the heater indicates how the circuit of gases is completed. Gases are led



*Floor heater, with telescoped piping between valve and register*

from the valve through a small inner tube, then circulated through the element, and returned through the large outer tube. With this arrangement the warmer gases are insulated



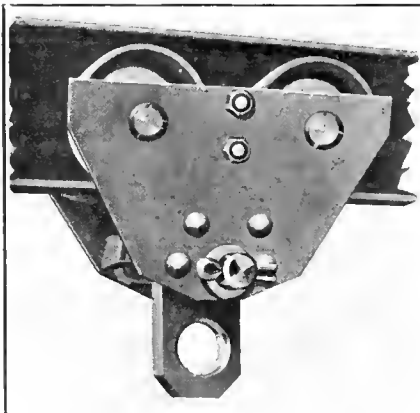
*Side view of Model "T" Menominee chassis designed for sixteen-eighteen passengers*

from direct contact with the air. The manufacturer states that 95 per cent of the heat from the engine can be radiated from the heater.

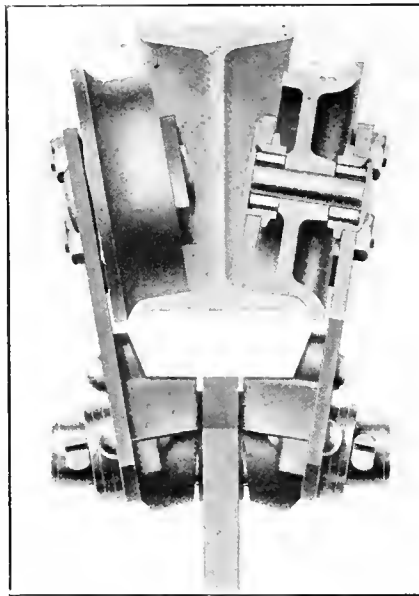
Each heater is supplied complete with valves, gaskets, tubing and all necessary fittings. There is one standard size heating element, but six sizes of valves are available to fit different types of motor vehicles.

### Roller-Bearinged Trolley for Moderate Loads

THE Yale & Towne Manufacturing Company, Stamford, Conn., has brought out a so-called Steel Plate trolley, which is said to combine strength and flexibility in an unusual degree. Made in 1-ton and 2-ton sizes, this trolley has a reserve of some seven times its greatest



*Separator projects beyond plates and acts as bumper when trolley strikes stop at end of I-beam track*



*Yale Steel Plate trolley, showing wheels carried on roller bearings and clevis attachment*

capacity. Curves of sharp radius can be taken without binding, since the non-rigid construction permits each wheel flange to follow the I-beam flange. In fact, it is said that the 1-ton size will run easily on a minimum 21-in. radius curve.

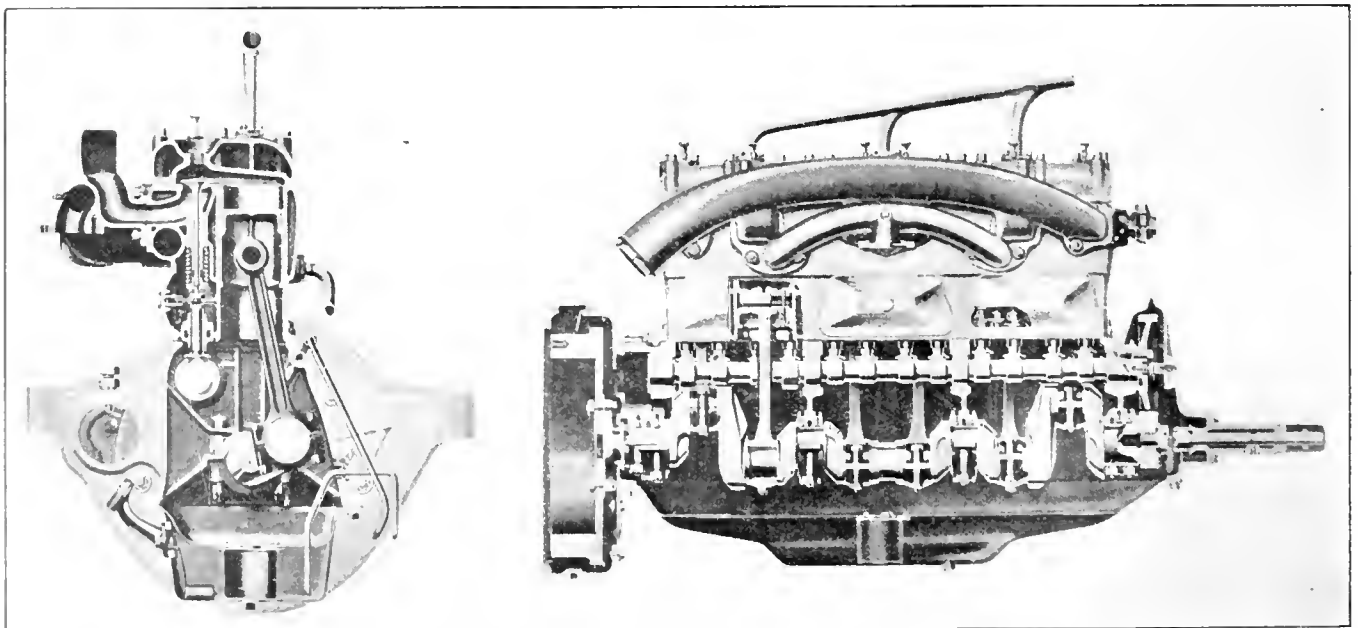
The construction is indicated in the accompanying views. Each of the chilled-iron tread wheels is mounted on roller bearings and attached to the side plates. These plates, in turn, are connected by a single equalizing pin which supports the clevis. The equalizing pin itself is cold-rolled steel, and when every

inch of headroom is needed, the chain block can be hooked directly over the pin. Otherwise the clevis shown is used.

Where heavy loads must be handled and placed accurately, the Steel Plate trolley is supplied in a geared construction. The two trolley wheels on one side are attached directly to gears, which mesh with a driving pinion mounted outside the steel plate. This pinion is operated by a chain wheel and hand chain, thus giving the operator control of the movement horizontally.

### Four Bearings on New Six

THE Model 6-B bus motor of the Continental Motors Corporation, Detroit, first shown on several chassis at the recent Atlantic City convention of the American Electric Railway Association, is designed to combine the flexibility of the high-grade passenger car motor and the ruggedness required for heavy-duty bus service. There are four main bearings, each 2½ in. diameter, on the crankshaft. The six L-head cylinders are cast in a single block. Cylinder heads are separate units and are removable. A pressure-feed oiling system is provided which supplies lubricant through a gear-type pump to a drilled crankshaft, to main bearings, connecting rods, lower end bearings and gear case. The oil pressure can be adjusted by turning a screw mounted on the top of the crankcase at the front end of the motor.



*Continental Model 6-B Bus Motor. Side view, with lower part in cross-sections to show crankshaft and camshaft layout. Section through intake manifold, showing valve arrangement*



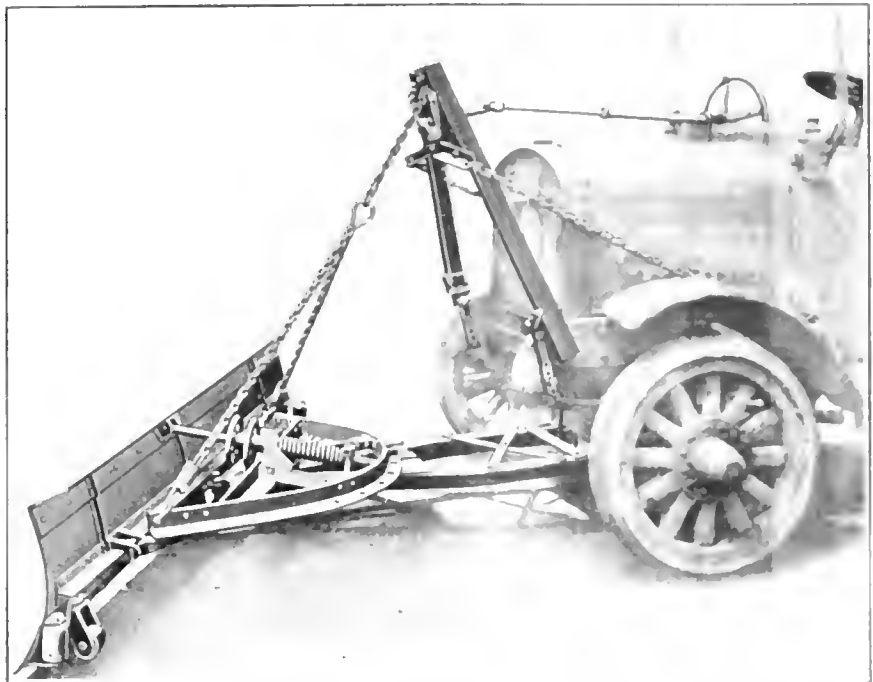
The horsepower of the motor, which is 3½ in. bore and 5-in. stroke, is given as 70 at 2,200 r.p.m. At 1,600 r.p.m. the performance curves show well over 56 hp. Valves and both manifolds are placed on the right-hand side. Valve heads are 1½ in. diameter. Manifolds are cast integral, forming an exhaust heated intake. The job is built to take an 18-in. diameter fan, driven by a flat belt 1½ in. wide. Magneto, lighting generator and water pump can be mounted on the left-hand side of the motor. The starting motor can be mounted on the right-hand side, the application being of the S.A.E. sleeve type, 3½ in. diameter.

### One-Step, Wide-Gage, Low-Level Bus Chassis

THE Guilder Engineering Company, Poughkeepsie, N. Y., has brought out a low level design in which stability and passenger comfort are the main features sought. The rear springs are underslung and the frame kicked up over the rear axle so that the floor line of the body at the service door is held to at least 26 in. from the ground. The front axle has a 64-in. gage and the rear axle one of 70 in., the latter being of the Wisconsin double reduction type.

In the power system is a Buda EBU bus motor, four cylinders, 4 in. bore by 5½ in. stroke. Clutch is of the multiple-disk type and transmission has four speeds forward both being of Brown-Lipe make. Leece-Neville starting and lighting equipment is supplied and a Willard heavy duty battery. A 30-gal. gasoline tank is mounted on the right-hand side, as shown in the illustration. Fuel is fed to the Zenith carburetor by a Stewart vacuum tank.

Two sets of brakes are used, a service on the drive shaft, this being 5 in. wide and 11 in. diameter, and



*Scraper snowplow mounted in front of bus and truck chassis.*

emergency on the rear axle. Budd pressed steel wheels are fitted with 36 x 6-in. pneumatic tires, single on front and dual on rear. Ross steering gear and Merrill springs are standard equipment on this chassis.

The weight of this Model 30 chassis is given at 5,600 lb.; it makes a normal speed of 30 m.p.h. in high gear and can turn in a 70-ft. circle. Over all the chassis length is 25 ft. It is 83 in. wide over the rear tires. Frame widths are 51 and 35 in. rear and front respectively.

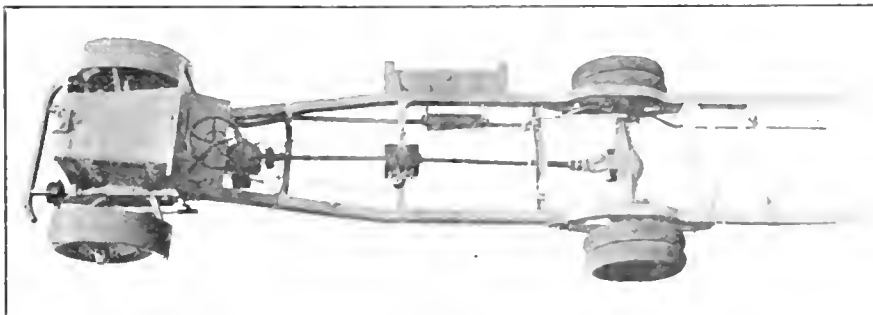
### Plows for Light and Heavy Snowfalls

THE Good Roads Machinery Company, Inc., Kennett Square, Pa., is now supplying two types of Champion snowplows. The scraper construction shown in the illustration comes with either 8 or 10-ft. scraper bars as desired. These bars with the edge attached are 20 in. wide.

This equipment can be piled on motor trucks or buses for all but the heaviest snowdrifts and snowfalls. A frame is placed between the front axle and a semi-circular member, the latter providing adjustment for the main scraper bar. To lift the bar a V-shaped brace is mounted on the front of the chassis frame, being held in position by chains leading to the rear of the hood. The hand wheel beside the vehicle driver winds up the chain attached to the scraper bar through a worm and gear connection.

As a result of the experience in clearing snow from the roads of northern New York and the New England States the company has brought out a V-type snowplow. This is 8 ft. wide, 10 ft. long and 5 ft. high and has an adjustment so that the front end can be raised 10 in. from the ground. The weight of the plow alone is 2,500 lb., this not including the side or widening wings, which can be supplied when the plow is attached to a heavy duty tractor.

In this construction a motor platform is carried on rollers and sleds, with a V-type plow bar mounted on it. The platform is attached through a push frame to the motor vehicle. Either a heavy duty tractor may be used or two 5-ton trucks are used to operate together, one pushing and the other pulling. With the tractor hookup, a set of widening wings and a turning device can be furnished. These wings permit clearing a path 16 ft. wide through light snows.



*Looking down on top of the Guilder low-level bus chassis of 190-in. wheelbase. Fuel tank mounted at right side of frame. Notice exhaust pipe extending well to rear of chassis.*

# Condensed Specifications of Motor Vehicles for Bus Service

Revised to November 1, 1923

Trade Name and Model	(Capacity, Seats	Unloaded Weights, Lb.		Main Dimensions			Normal Speed, M.P.H.	Engine Details							Electrical Equipment			Transmission		Axles		Steering Gear	Springs	Brakes	Wheels		Tires																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transporta-  
tion industry.

## Taming the Rampageous Automobile

National Safety Council, at Its Twelfth Annual Convention, Discusses Highway Safety—Bonus Systems as Used for Transportation Employees—Education Required from Cradle to Grave

THE meetings of the National Safety Council are usually encyclopedic in their variety and extent. At the twelfth annual safety congress, which this organization of experts in accident prevention held at Buffalo early in October, various sections, from automotive down through the alphabet to wood-working, discussed the safety work in their special industries. Related to bus operation were the proceedings at the Public Safety, Electric Railway, Taxicab, Education and general sessions of all the sections.

Executives of transportation systems told that they were cutting down costs for damage claims. Educators explained how young America is being influenced to "stop, look and listen" before crossing streets and highways. Representatives of states and municipalities described their work in decreasing accidents and in solving the traffic congestion problem. In discussing all these subjects the automobile was given careful, and not always tender, attention.

### PAYING FOR SAFETY AND COURTESY

A no-accident bonus will pay for itself and will also give the owner of a transportation system more time to develop business. John W. Weibley, head of a Pittsburgh taxicab company, recommended the setting aside of \$5 a month for each vehicle in operation, this to go to the drivers with a clean record. There must be rules for winning the bonus, but make them simple and sane. Change the rules a little each month. This stimulates the interest of the men. Arrange the rules to help them save money. This can be done by a deposit in a savings bank to the account of winners, or by using their winnings to help buy stock in the company.

A more complicated award system, in use satisfactorily for three years by the Los Angeles Railway, was outlined by George B. Anderson, manager of transportation for that company. Conductors and motormen who make a certain record for courtesy and safety are entitled to a bonus of \$60 a year, payable in the middle of December. Each man starts the yearly period with 100 per cent rating. From five to fifty points may be subtracted from this as demerits, or added to it as credits for

good work. To get the full bonus, the rating must be 100 per cent at the end of each month; for each 1 per cent below that, 25 cents is taken off. A rating of 95 per cent would leave \$3.75 due the man for the month involved.

There are some eight types of meritorious service, while on the other side of the ledger thirty-eight items may lead to trouble, and to a loss of points. It is found that a man who is courteous to passengers is good on safety also.



*This is Auntie J. Walker, a character widely used in New York City on posters and other literature for a city-wide safety campaign.*

Insolence or discourtesy and collisions between cars are dealt with severely. Running ahead of time is another offense heavily penalized; it is regarded as an unnecessary and demoralizing practice, and as exhibiting an inclination toward careless operation.

The system has now been in operation since April, 1920. It has been changed somewhat, but in general the company O.K.'s it for accident prevention and courtesy promotion. The men like the bonus, of course, but they also have a personal pride in keeping their records clear. It is recognized according to Mr. Anderson, that the success of the system depends largely on the temperament of the men responsible

for its execution. Firmness, poise, self-control, capacity for judging men, a spirit of justice—these are essential.

D. E. Parsons, general manager East St. Louis (Ill.) & Suburban Railway, upheld organized safety work, or, as he termed it, "a practical systematic and continuous program for safety." The benefits are fewer accidents, savings in claims for damages and better public relations.

According to the Illinois law, automobile drivers must stop before crossings where "stop" signals are placed. In its safety work Mr. Parsons' company has helped to convince the Illinois Commerce Commission that about 50 per cent of its crossings are extra-hazardous, instead of about 10 per cent, and as a result the commission has installed "stop" signs on the larger number.

At the suggestion of the local automobile club, a special lens was placed on the interurban electric cars. This cuts down the glare and gives about the same illumination as the clear glass lens used originally. Motormen on the interurbans are required to slow up at cross-roads so that collisions are improbable. This is an addition to the regular rule, to sound whistle or ring bell vigorously.

The greatest hazard today is that of collisions with automobiles. About 50 per cent of the total accidents on the East St. Louis system are street car-auto collisions. The number of collisions between moving trolleys and other vehicles has decreased of recent years, but there has actually been an increase in the number where automobiles collide with trolley cars standing still.

### CROSS CROSSINGS CAUTIOUSLY

Discussing the safety campaign of the American Railway Association, H. A. Rowe, claims attorney Delaware, Lackawanna & Western Railroad, told the conference that "passing the buck" must be cut out. Every person and authority charged with the construction, maintenance and operation of our railroads, with the construction and maintenance of our highways, with the enactment and enforcement of traffic regulations, with the manufacture and sale of automobiles, with the training, licensing or employment of drivers, with the ability and facilities to directly or indirectly mold public opinion, every person riding as passenger in an automobile and every driver—all these should realize the obligation and opportunities they have of minimizing the tragedies of travel, of doing work that is worth while, and of adding to the sum total of human happiness.

The railroads are doing what they can, according to Mr. Rowe, by watching closely their whistle, bell and headlight equipment, and also their employees to see that these warnings are used intelligently and faithfully. On July 29 ten crossing accidents resulted in the death of twenty-six persons, and on two occasions recently nine were killed in a single crossing mishap. There is also one instance

where fifteen out of nineteen persons were killed in a bus collision. This indicates the immediate remedy, which is to impress upon the driving public the responsibility that is theirs for the lives of others.

Competency and care should be demanded from drivers of automobiles equal to that demanded from engine drivers. No railroad company, said Mr. Rowe, would for a moment permit a train containing passengers to be operated over its lines unless sure the engine driver had had substantial experience, was thoroughly qualified from physical, mental and operating standpoints, and in addition the engineer is disciplined for infractions of stern rules. No such safeguards, however, are thrown around the drivers of automobiles, who also transport passengers.

The American Railway Association has developed a plan for uniformly and clearly marking the approach to railroad crossings. At a point about 250 ft. from the intersection with the railroad tracks two broad white lines about 5 ft. apart, with the letters "R.R." between them, are painted on the highway. This for the benefit of the average driver who keeps his eyes glued to the road and observes little at his right or left. As a second warning a single broad white line is marked across the highway at a point about 150 ft. from the crossing. Then a third warning is a line painted red or marked with a cross bar about 25 ft. from the crossing. This gives the driver positive knowledge of his presence in the zone of danger, but he is still safe if precautions have been taken as suggested by the two other warnings. More than twenty states, Mr. Rowe said, have already signified their intention of adopting this system or of trying it out.

#### EDUCATING THE PUBLIC

Pedestrians of all ages and drivers of cars are being educated to decrease accidents on the street and highways. Father John P. Boland of Buffalo told how school children were being taught street safety by means of "traffic" games.

The Hon. Robbins B. Stoeckel, Commissioner of Motor Vehicles of Connecticut, compared the present situation to a spreading epidemic, the very magnitude of which will lead to corrective forces. He rated the personal equation as the most important element in decreasing traffic dangers. Highway conditions and car equipment are important, but first a driver must have the mentality, a good enough mind to drive. Calling for remedial measures are speed, bad passing from the rear in bad locations, bad sight lines and lack of caution in passing street cars. In equipment there are poor lights, including bad use of good lights and especially the poor use of spotlights, running with one lamp and unlighted rear lamps.

In addition to a constructive plan of safety education, Commissioner Stoeckel recommended the following general program to combat highway dangers:

### Meetings, Conventions and Exhibits

- Nov. 10-11 National Highway Association Joint meeting with Michigan State Good Road Commission, Michigan, Ann Arbor.
- Nov. 10-11 Annual meeting of the Society of Automotive Engineers, National Research Council, Washington, D. C.
- Nov. 12-13 Automobile Association of America Annual Exhibit and Convention, Chicago, Ill.
- Nov. 14 Annual Meeting, Automobile Association, New York State Power Hotel, Rochester, N. Y.
- Nov. 14-15 National Traffic Motor Association Annual Meeting, New York City.
- Nov. 20-21 Michigan Highway Traffic Association Association, Port Huron Hotel, Grand Rapids, Mich.
- Dec. 10-13 National Petroleum Institute Annual Meeting, Statler Hotel, St. Louis, Mo.
- Jan. 1-11 First Annual Convention, Motor Bus Association of Virginia, Richmond.
- Jan. 5-12 National Automobile Show, Eighth Coast Artillery, Army, New York City.
- Jan. 22-25 Society of Automotive Engineers, Annual Meeting, Detroit, Mich.
- May, 1924, International Motor Transport Congress, Detroit, Mich.

1. An adequate law tried in the state where made, with considerations for laws of other states having the same problem. The essential features of this law are: a state operators' licensing system, and a state record of all accidents involving automobiles.

2. State and city highway construction with a special study of and care of both the pedestrian and the automobile driver.

3. State and city supervision by adequate police, as widespread and well covered as possible, so that as much of the state and city traffic as may be will be directed traffic or supervised traffic.

#### WHAT NEW YORK IS DOING

The steps to secure public safety in New York City were explained by Marcus Dow, executive secretary of the Bureau of Public Safety connected with the City Police Department. Mr. Dow, who is also president of the National Safety Council, found that the majority of accidents to pedestrians were caused by jaywalking. A campaign is therefore being conducted to get the public to use the crosswalks and keep away from the middle-of-the-block crossings. Shown in the illustration here is a character that has been used widely on safety posters in New York City.

The Police Department is also endeavoring to eliminate reckless drivers and speed maniacs from the streets of the city. Since the first of the year police lieutenants attached to the Bureau of Public Safety have conducted eight hundred meetings where safety lessons were given to motor car drivers. The Brake Inspection Squad of this bureau has obtained more than fourteen hundred convictions for operating cars with defective brakes.

Street accidents in New York, in spite of its being the largest and most densely populated city in America, are lower in proportion to population than in many other cities. New York has 3,100 miles of streets and more than 6,000,000 people in its five boroughs. There are 350,000 vehicles registered, to say nothing of thousands of visiting cars driven daily into the city.

City traffic is not necessarily free use of street space rather than a lack of it. George Kelley, manager of traffic engineering, New York American Gas, Association Company, Elizabeth, N. J., would not agree that the traffic to eliminate is the traffic in the section of the city. Motor cars, traffic and and should be given the right of way and should be given the right of way path of the street, and not the street with the motor cars. Kelley said that traffic is a complex problem and a long time to be passed to make it work. Kelley said that the traffic is a complex problem and a long time to be passed to make it work.

#### WHITE ACCIDENTS

From 8 to 10 per cent of the accidents in New York City are due to white accidents. Kelley said that the traffic is a complex problem and a long time to be passed to make it work. Kelley said that the traffic is a complex problem and a long time to be passed to make it work. Kelley said that the traffic is a complex problem and a long time to be passed to make it work. Kelley said that the traffic is a complex problem and a long time to be passed to make it work.

#### Louisiana Bus Lines Organize

THE organization meeting of the Louisiana Motor Transportation League was held in New Orleans during the first week in October. The purpose of the league is to aid in the passage of legislation favorable to the operation of motor bus lines in Louisiana. W. H. Johnson of the Tri-State Transit Company, Shreveport, La., was elected president.

Other officers elected are: F. J. Feight, Franklin, vice president; M. W. Walker, Alexandria, secretary-treasurer, and Aaron Todd, Covington, La., director.

The following firms signed their intention of joining as active members: Higgins' Bus Line, New Orleans; Jefferson-St. Charles Transfer Company, New Orleans; Todd Brothers' Bus Line, New Roads; Port Allen, Raplaque Line, Port Allen; Stewart State Line Company, and the Tri-State Transit Company, Shreveport; Todd Transfer Company, Franklin.

Any person or firm who owns and operates motor vehicles in the state for transportation of passengers or freight is eligible for a five membership. Any person or firm directly connected with the operation of, or furnishing necessities for motor transportation is eligible as an associate member, the constitution of the organization provides.

C. E. Patton of the White Company, New Orleans, presided at the meeting which was well attended.

## Operators Get Together in Virginia

**M**ORE than 100 Virginia bus operators gathered in Richmond on Oct. 22 and organized the Motor Bus Association of Virginia, elected officers and called an annual convention for January, to meet in Richmond.

Mayor George Ainslie welcomed the delegates to the city and S. A. Markel, who called the meeting, spoke on the growth and future of bus transportation. George L. Wilcox was made temporary chairman and Mr. Markel convention secretary.

The convention began business by naming committees on rules, resolutions and organization. J. T. Farris of Fincastle, J. W. Callahan of Norfolk, O. E. Robertson of Newport News and E. H. Gregory of Danville were named as a committee on resolutions.

C. B. Trent of Roanoke, A. W. McPherson of Portsmouth, J. A. Towns of Harrisonburg and J. B. Spry of Norfolk were named on the rules committee. The organization body was composed of E. D. Hathaway of Portsmouth, J. Randolph Tucker of Richmond, T. H. Scott of Bluefield, J. H. Hocutt of Norfolk, J. T. Farris of Fincastle, L. C. Major of Portsmouth and J. L. Hudson of Portsmouth.

Major Alexander Forward, Corporation Commissioner in charge of transportation in Virginia, then spoke, urging the organization to go before the next General Assembly and correct abuses of the law by having amendments passed and an appropriation made so that the Corporation Commission can employ a supervisor of transportation whose duty it would be to eliminate unfair practices of unlicensed operators. Major Forward pointed out that the Virginia commission is powerless to enforce the law because of flaws in the statutes, and that while the commission's stand is one of absolute fairness to the legal operator, it is powerless to act against the illegal bus owner.

A transportation supervisor, he told the convention, would be empowered to initiate legal action against those who break the law and to prosecute illegal operators competing unfairly with certificate holders.

The convention enthusiastically endorsed Major Forward's suggestion and passed resolutions requesting the General Assembly to strengthen the present bus regulatory measure by putting "teeth" in it.

A resolution was also passed endorsing the activities of the Corporation Commission and condemning unjust criticism thereof. Another important resolution, passed unanimously, stated that there would be no toleration of the use of buses by members in violation of the Eighteenth Amendment.

Officers were elected following the report of the committee on organization. This committee reported that it needed more time to complete its work, but that it recommended the formation of an association at once, and that action

be taken immediately upon the policy of the body, election of officers, dues and membership. The report was accepted and a plan for the election of a president, five vice-presidents and a secretary-treasurer was adopted.

The initiation fee was set at \$5 for every bus operated by a member. Thirty-five operators joined the association immediately.

It was determined that the president and vice-president, the secretary-treasurer and four others be named the executive committee or board of directors, and this report was adopted.

Mr. Wilcox, from the chair, then named L. C. Major of Portsmouth, R. W. Hoggan of Roanoke, F. A. Bristow of West Point, E. D. Hathaway of Portsmouth and J. H. Hocutt of Norfolk as a nominating committee.

The committee brought in a report, which was adopted unanimously, and Richmond was selected for the next convention, to be held in January.

The officers elected, as reported by the committee, follow:

President, J. W. Callahan of Norfolk; vice-presidents, in the order named, J. A. Towns of Harrisonburg, F. A. Bristow, West Point; J. Harvey Dillard, Center Cross; Thomas H. Scott, Bluefield, W. Va., and E. H. Gregory, Danville. E. D. Hathaway of Portsmouth is secretary-treasurer.

The executive committee will be J. T. Farris of Roanoke, Lewis McMurrin of Newport News, R. L. May of Baneroff and A. W. McPherson of Portsmouth.

## Connecticut Association Meets

**T**HE second annual meeting of the Connecticut Motor Stage Association, Inc., was held in New Haven on Nov. 2.

The gathering of bus men from all parts of the state was characterized by an enthusiasm and spirit of co-operation that augurs well for the success of the organization.

Carl W. Stocks, editor of BUS TRANSPORTATION, addressed the session on the advantages to bus operators of membership in a bus association.

## N.A.C.C. Has New Truck Secretary

**E**DWARD F. LOOMIS of Springfield, Mass., has been appointed secretary of the motor truck committee of the National Automobile Chamber of Commerce, to succeed F. W. Fenn, who has entered the truck business. Mr. Loomis was graduated from Amherst in 1917 and after service on the Springfield *Republican* became managing editor of the New London *Day*. The committee which guides the motor truck activities of the chamber consists of Windsor T. White (White), chairman; C. H. Browning (International Harvester), D. C. Fenner (Mack), David S. Ludlum (Autocar), Robert O. Patten (Pierce-Arrow), M. L. Pulcher (Federal) and E. A. Williams, Jr. (Garford).

## Bus Parade to Feature Ohio Meeting

**O**HIO bus men will gather at Columbus on Nov. 14 for the annual meeting of the Ohio Motor Bus Owners' Association. Headquarters will be located at the Southern Hotel. The association membership is growing rapidly, according to reports.

A feature of the day's program will be a parade of buses—the very buses that are operated over Ohio highways by Ohio bus men. Every member has been urged by the association to drive to Columbus in one of his own buses to take part in the parade. There will be a dinner in the evening at the Southern Hotel.

## Insurance and Snow Removal Live Topics at New York State Meeting

**A**T THE first fall meeting of the Auto Bus Association of New York State, held in Syracuse on Oct. 4, some very important matters, chief among which were compulsory bus insurance, snow removal and state-wide bus time-tables, were discussed.

The association will sponsor an amendment to the highway law calling for removal of snow by the state on all highways having motor traffic of 500 cars or more every twelve hours, based on the State Highway Department census. Previous bills have attempted to solve the problem by having the state appropriate funds to be duplicated by the counties, but this bill will put the entire responsibility where it belongs—on the State Highway Department.

In his discussion, Secretary J. J. Dadd pointed out that the railroads will benefit by snow removal inasmuch as all of them receive freight over state highways. He also decried the fact that the state and county governments spend millions yearly in building and maintaining roads, only to have them closed by snow blockades at least one-third of the year. He told how communities in central New York had suffered last winter because highways were not kept open. Merchants felt the brunt of the burden because buyers were unable to reach the small towns and villages, so they are therefore expected to solidly back this program.

The association decided that for the best interests of the bus owners of the state it would be advisable to amend the highway law so that all passenger-carrying motor buses would come under the provision which makes insurance compulsory. As the law now stands it is applicable only in cities of the first class.

A state-wide time-table containing the time-tables of members of the association will be issued by the association early in 1924.

The next meeting of the association will feature the election of officers and will be held Wednesday, November 14, in Rochester.



# News of the Road

From wherever the bus runs, are brought together the important events, here presented to show the movements of the day



## Suburb Starts Own Bus Line

Residents of York, Pa. Suburb Maintain Own Bus Line by Voluntary Contributions

RESIDENTS of East York, Pa., have started their own bus system. It is operated by the East York Improvement Association, which started the route after the York Railways had indicated it could not extend the trolley service from the city of York to the suburban communities.

Regular round trips are made by the buses between East York and Center Square, York. The buses run from 12 o'clock noon until 6:30 p.m. on a half-hour headway. The buses used are entirely a York product. The chassis were constructed especially for the purpose by the Atlas Truck Corporation, and the bodies were designed and built by the Hoover Body Company. Each bus seats twenty passengers and has comfortable standing room for ten additional passengers.

George H. Brodner, president of the East York Improvement Association, in announcing installation of bus service, said: "Officials of the railway expressed themselves as feeling that the company was not warranted in giving us anything better than the present service. In view of this decision we had to install our own bus service. Officials of the railway have said that the cost per passenger to operate the buses would be prohibitive, but we believe the officials are mistaken in this opinion."

The York Railways has filed complaint against this Community Bus Line operation. Formal notice of the complaint has been served on John H. Longstreet by the Public Service Commission at Harrisburg. The date for the hearing has not yet been set. Mr. Longstreet declares that he will fight to the finish any move on the part of the York Railways to stop the operation of the line.

### SUPPORT GIVEN BY THE RESIDENTS IS GRATIFYING

The Community Bus Line has been operated for four weeks and has been gratifyingly supported by the residents and property owners of East York, who maintain the service by voluntary contributions. These are dropped into a little receptacle as one enters the door and no specified amount is required in order to ride in the bus.

In the statement made by Mr. Longstreet, against whom the complaint has been lodged, he said:

"The action of York Railways is no

surprise to me. It expects the Public Service Commission to help it by interfering in its behalf. We have been forced to put on the community bus. We have forty homes on our East York district and more than 200 property owners, and they and their friends are maintaining our service by voluntary contributions. The community bus will run, and the residents of East York and all their friends are welcome to ride in it. We are not operating for profit, but for service, and if our friends keep riding and contributing their pennies, nickels and dimes, they will come mighty near paying all expenses; if not sufficient, additional contributions are pledged to sustain the service."

## East Coach Line Starts Interstate Service

Installation of bus service between Trenton and Atlantic City, N. J., and Philadelphia, Pa., mark the first interstate automobile transportation service in New Jersey to be operated on a regular daily schedule. Hard-line, comfortable, limousine type buses, plus included, now make two trips each way every day. They are operated by the East Coach Company, which for the last two seasons has maintained sight-seeing service to Cape May and points of interest in Atlantic County, N. J. The new service is popular with both residents and visitors in Atlantic City.

## Fifteen Electric Railways Enter Bus Field

Pacific Electric Adds Line and Plans Four More—Los Angeles Railway Starts Wilshire Service—North Shore Announces New Routes in Illinois—Trackless Trolleys in Philadelphia and Rochester

THEY'RE falling into line and falling fast!

This may be vernacular, but it does express aptly the condition which exists among the electric railways of the country with regard to the evident rush they are making to enter the automotive field. From every section of the country come these reports. October's record shows that fifteen trolley companies have either begun operation of buses or have indicated their intention of doing so. Twenty-two new bus lines have been established or planned by these fifteen companies.

The greatest center of activity seems to be in southern California, where the Pacific Electric Company has begun operation of one new line and is making definite plans for four more.

Service was started Oct. 11 on the Ventura Boulevard for the entire length of the San Fernando Valley. This service is said to be the result of a demand on the part of residents along the boulevard and hundreds of persons elsewhere who indicated that they intended to locate there if bus service was established. Two twenty-five-passenger White buses are now in use and more will be added as occasion requires.

The four other lines to be operated by the Pacific Electric are between San Gabriel and the intersection of Graves and Jackson Avenues, Los Angeles; between San Gabriel and the intersection of Rosemead Avenue with the Pacific Electric Covina line; between Lamanda Park and the Michilinda Station of the Pacific Electric Monrovia

line; between the intersection of State Street with Ocean Avenue and the intersection of Center Street with Somerset Avenue in Los Angeles.

In the same territory the Los Angeles Railway has established the new Wilshire Boulevard line. The first bus was placed in this service on Oct. 10. The west terminal is at Wilshire and La Brea, serving newly developed territory. The buses run east on Wilshire Boulevard to Park View Street, then to Seventh Street, to Lake, and to Eighth, making a loop on Eighth, Grand, Fifth, and Olive Streets to Eighth and returning to the starting point. The fare which will be charged on the new line is 10 cents.

The 10-cent fare includes transfer privileges to Los Angeles Railway cars at connecting and intersecting points. Passengers boarding Los Angeles Railway cars and desiring to transfer to the Wilshire bus line pay 5 cents additional fare when they present their street car transfers to the bus operator. Fifteen-minute service is operated from 6 a.m. to midnight.

### NORTH SHORE PLANS NEW LINES

One of the most significant reports on railway bus operation comes from Illinois, where the Chicago, North Shore & Milwaukee Railroad plans to operate a bus line from Chicago to the state line at Wisconsin through Evanston, Wilmette, Kenilworth, Winnetka, Glencoe, Highland Park, Lake Forest, Lake Bluff, North Chicago, Waukegan, Zion and Winthrop Harbor.

This action on the part of the com-

pany shows an evident intention to maintain a bus service which practically will parallel the service now rendered by the electric line.

The plan is developing much more rapidly than officials of the railroad figured when they first decided to operate a bus line between Waukegan, Zion and Kenosha, it is said.

The through line to Chicago will be augmented in the near future by service to the Lake region of western Lake county, reaching out to adjoining counties. The service is proving to be an extremely popular one, according to reports.

#### TRACKLESS TROLLEYS START IN PHILADELPHIA

Trackless trolleys were put into operation by the Philadelphia Rapid

were installed on the crosstown line through Driving Park Avenue and motor bus service was started on Dewey Avenue from Ridge to Britton Road.

The company has established fares on the Dewey Avenue bus line as follows: The fare from Ridge Road to the city line will be 7 cents, with transfer privileges for the city lines; the fare from the city line to Stone Road will be 3 cents, and from Stone Road to Britton Road, 5 cents, making a total fare of 15 cents, including service on the city lines. This will make the bus ride from Ridge Road to Britton Road, virtually the entire length of Dewey Avenue, cost 8 cents. There will be a fare concession for the persons working at the Eastman Kodak Company, who travel from one zone to another. There will be no charge for

Following is a summary of other developments in the field of bus operation by electric railways:

The Scranton Railway is to operate a bus line in the Keyser Valley section of the city.

Two buses are to be provided to insure continuous service. As soon as the buses are received the service will be started, it is said. There will be fifteen-minute service from the end of the Washburn Street trolley line over a route to be decided upon by the people themselves. The only stipulation the company will make is that the route be such as to permit of a fifteen-minute service.

This marks the end of a long and determined effort on the part of the Keyser Valley Improvement Association, which has been urging the trolley company to extend its line into that section. The establishment of the bus line will give the people the service they evidently desire and they have indicated that it will be as satisfactory to them as an extension of the street car lines.

Another Pennsylvania railway, the Lewistown & Reedsville Electric Railway Company, proposes to operate a bus line in Reedsville and adjacent towns. The buses, according to plans, will be run on streets where the construction of tracks would be unwarranted due to the large financial outlay. The buses will be run on regular schedules. A 6-cent fare will be charged and transfers to trolley cars issued free.

The Waterloo, Cedar Falls & Northern Railway will operate a new bus line between Waterloo and Winthrop, Iowa, according to a recent announcement of the company. The Waterloo terminal of the line will be at the Gedney Hotel. Buses seating twenty-five passengers will be operated.

The Dubuque Electric Company recently installed a bus line from Dubuque to East Dubuque. Three seventeen-passenger Graham Brothers buses are used.

Permission to operate buses was asked of the Public Utilities Commission of the District of Columbia recently by the East Washington Heights Traction Railroad Company. A bus service from Washington to Randle Highlands is proposed. The president of the company recently declared that ten first-class buses would be operated if the necessary permit was granted.

A contract has been let by the West Penn-Monongahela Public Service Company as a preliminary to operating a bus service between Riversville and Morgantown, W. Va. The contract for three chassis has been awarded the Pierce Arrow Motor Company of Buffalo, N. Y., and to the Kuhlman Car Company of Cleveland for the three bodies. Each bus will accommodate twenty-five persons. The buses ordered will be delivered about Jan. 1.

The Jackson Public Service Company, Inc., operating in Jackson, Miss., has just introduced an auxiliary bus serv-



*A "Fair" load on the Western Avenue line in Los Angeles*

Transit Company on Oct. 14, about three weeks after the installation of bus service by the same company on Roosevelt Boulevard. The trackless trolley line runs on Oregon Avenue east to the Tidewater Docks on Delaware Avenue. The running time is thirty-five minutes.

The line is run over Oregon Avenue in order that service may be promptly supplied to the 2,000 men now employed at the Tidewater Docks, and to the growing population south of Snyder Avenue, who would otherwise be without car service for some considerable time to come.

The company has announced through Thomas E. Mitten, chairman of the executive committee, that just as soon as the trackless trolley operation on this route has passed its experimental stage the company will be glad to consider the advisability of extending the service westerly over Passyunk Avenue and Sixty-third Street to Woodland Avenue.

#### NEW ROCHESTER LINES

Trackless trolley operation was also begun in Rochester, N. Y., during the week of Oct. 28 by the New York State Railways. Five of this type of vehicles

service on the trackless trolleys, other than the prevailing city fare.

The trackless trolleys each seat twenty-five persons and weigh empty about 11,500 lb. Fully loaded, they weigh approximately 17,100 lb.

Twenty-minute service will be installed on the trackless trolley line in non-rush hours, and the headway will be about twelve minutes during the rush-hour periods. Virtually the same service will be maintained on the Dewey Avenue bus line.

The Interstate Public Service Company is conducting an interesting bus experiment in New Albany, Ind., where buses have been substituted for the electric railway on Elkin Avenue. The patrons of the line will be allowed to determine, after six months of operation, which service they prefer. While buses will not be operated on the same streets as the car line on account of the condition of the streets, the company proposes so to operate the buses as to cover territory now served by the Elkin Avenue trolley line.

Upon the result of this experiment will hang the decision in regard to the replacement of the entire trolley service with buses by the Interstate company in Columbus, Ind.

ice to its electric railway lines which will serve to link up hitherto unconnected sections. Details of operation will be forthcoming at a later date, it is said.

In Little Rock, Ark., the Inter-City Terminal Company has added a new route to its bus system operated there. It runs from Fourth and Main Streets, east on Fourth Street to Poplar Street, south to Third Street, west to the Broadway Bridge, over the bridge to Markam Street, return to third and Main Streets and then north to Fourth Street. The buses on this route are operated only from 6 a.m. to 9 a.m. and from 4 p.m. to 7 p.m.

The Rome City Street Railway, a subsidiary of the New York State Railways, proposes to replace with buses a shuttle trolley line running from the main tracks of the company in Rome to the New York Central station. The railway, in requesting a permit from the local authorities, promised to meet all trains and to charge the fare now prevailing on the electric railway lines of the company.

The public utilities commission of Utah has granted permission to the Utah Light & Traction Company to operate a crosstown bus line in Salt Lake City to connect with its trolley line at State and Thirty-third South Streets, and to run east to the community known as East Mill Creek. The bus fare has been fixed at 10 cents and special rates for school children are to be put into effect.

The matter came before the commission originally on the petition of the Blue & Gray Bus Line, which proposed to operate a similar line. The railway company protested, and finally introduced a petition in intervention, asking the privilege of operating, in place of the proposed independent service, one of its own. The request was granted.

It is the intention of the company to place in service buses seating twenty to twenty-four passengers. An hourly service will be maintained.

Boston, Mass., is to have a crosstown bus line soon, if the plans of the Boston Elevated Railway come to fruition. Residents of Hanover Street have urged for some time the operation of buses to serve that vicinity. Such a change will, it is expected, help to solve the problem of traffic congestion which forced out the trolley cars along Hanover Street recently.

In North Reading, Mass., an agreement has been entered into between the selectmen and the trustees of the Eastern Massachusetts Street Railway under which a bus line is to be substituted for the trolley cars between Reading and North Reading.

This is an old line on which the road bed is uneven and the tracks are so badly worn that it soon would be necessary to relay the tracks. It would cost so much that the trustees of the Eastern Massachusetts did not feel warranted in assuming the expense. Under the provisions of the act cre-

ating public control of the Eastern Massachusetts, the trustees are empowered to withdraw service which does not pay. The company will tear up the tracks and will operate buses over the same route and charge the same fare as on the railway. The new route will begin about Dec. 1.

#### WATERFRONT BUSES IN SAN FRANCISCO

By a unanimous vote, the Board of Supervisors of San Francisco, Cal., on Oct. 22, authorized municipal operation of a bus line along the Embarcadero and instructed the Board of Public Works to prepare plans and specifications and call for bids.

Decision as to the type of bus to be used has not yet been reached. The

plan is to operate a line of a half-dozen buses on the Embarcadero Street from the Ferry Building to the Railroad Building, and to have the cars run on the Embarcadero from the Ferry Building to the Ferry Building, and to have the cars run on the Embarcadero from the Ferry Building to the Ferry Building.

At present, the Board of Supervisors of San Francisco, Cal., is considering the plan of operating a bus line along the Embarcadero and instructed the Board of Public Works to prepare plans and specifications and call for bids. The Board of Public Works is also considering the plan of operating a bus line along the Embarcadero and instructed the Board of Public Works to prepare plans and specifications and call for bids.

## British Bus News Summarized

**Congested Cities Need Buses with More Seating Capacity, Says A. E. Berriman—Popularity of "Anywhere Tickets" Forces Extension of Plan—Bus Supersedes Tramways in Several Towns—Gasoline Prices Reduced in England and Scotland**

AT THE annual meeting of the British Association for the advancement of Science, held in Liverpool in September, A. E. Berriman, a well-known authority on automobilism, read a paper on road transport. In the part of his address relating to passenger vehicles he spoke of the great improvement that had recently taken place in the durability of pneumatic tires owing to the adoption of the cord principle of construction. The average life of a pneumatic tire was probably at least double what it was a few years ago. That result encouraged a belief that it would only be a question of time before the pneumatic principle held sway over a wider field than it controlled at present. In regard to the motor bus, he said that in the design of buses for use in London and other congested cities the problem of weight reduction was paramount. There was the need of more seating capacity without increasing either size or weight. It looked as if some radical change in design would be necessary for further progress. Turning to trackless trolley buses, Mr. Berriman spoke of certain cases in which tramway authorities with worn-out tracks had avoided the expense of relaying by adopting the trolley bus. The characteristics of the electric motor as applied to road traction differed significantly from those of the petrol engine combined with a gear box. For a comparable weight of equipment and tractive effort on hills, the ultimate speed on the level would be less with a trolley bus than with a petrol vehicle, although it did not follow that it need be inadequate for practical purposes over a chosen route. For general road as for general rail traction, the electric vehicle of reasonable weight needed a mechanical two-speed gear in order to do itself justice. In regard to the subject of the cost of road improvement, he said that the vexed question of taxation on motor vehicles was one that

deserved urgent and definite public consideration. Road was a national heritage in the use of which all members of the community participated, and none could logically claim exemption from the obligation to contribute something toward their proper maintenance and reasonable improvement. Another subject of great importance was the automatic control of traffic. It would be necessary for future safety definitely to work on the principle that every crossing had a primary and a secondary stream of traffic and that the primary traffic must be given the right of way, while the drivers on the secondary road were warned by a sign to go slow. The primary traffic could not afford to slow down at every crossing, and did not in fact do so. The cost of providing the necessary signs would not be more than it was worth to secure the benefits that would accrue from the system.

The weekly passenger fares had become well known in America, but had not been tried in one or two places in England, but perhaps what is called the "anywhere" ticket is a success story in the United States. According to the Berriman, Mr. Berriman, the Berriman, is pleased with the experiment as it is extending the system. In the past "anywhere" tickets were available only on the London and Fenchurch, but they are now available on Tuesday, Wednesday, Thursday, and Friday. The tickets were issued at a flat rate, but the price varied according to the facilities available from the system where issued. The most expensive ticket, issued from Birmingham, was about 2s. 6d., is from Bradford.

Buses of various kinds and another promise to supersede tramways on a small scale in a few moderately sized towns in England. The Dorchester Town Council, for example, proposes to get authority to run trackless trolley

cars. There is a proposal on foot to raise the level of certain roads on which there are tramways and the idea is that the tracks will not be reconstructed and the railless trolley buses will be employed. Nelson Town Council has had some favorable experience with petrol buses and proposes to substitute them for one of the tramway lines.

On Sept. 25 the prices of leading brands of petrol were reduced throughout the United Kingdom by 2d. per gallon. The reason assigned was overproduction in America. The present fall, when added to that of July 19 last, brings the total reduction for this year to 5½d. per gallon. The prices in England now are 1s. 6½d. per gallon for grade No. 1 and 1s. 4½d. for grade No. 2. In Scotland the prices are 1d. and in Ireland 2d. higher. At the time of the armistice grade No. 2 was 3s. 8d. and No. 3 3s. 7d.

During the last three months the London General Omnibus Company kept records of skidding of its buses on greasy street surfaces. The number of serious cases was thirteen, of which five occurred with B type buses, three with K type, five with S type and none with the N. S. type. It is thus concluded that the new type, with its lower center of gravity, is practically immune from skidding. Experiments are going forward with a new form of tire, with the object of arriving at a bus which will be for all intents and purposes practically skid-proof.

### Niagara Falls Mayor Wants Buses

Declaring that in his opinion electric railway lines in Niagara Falls, N. Y., had outlived their usefulness, Mayor Maxwell M. Thompson recently expressed himself in favor of substituting motor bus service for the trolley in that city. He recommended the proposition to the City Council on Oct. 6.

Mayor Thompson believes that a well-conducted bus line service would much better meet the city's need than the present railway system. The matter is said to have arisen out of the proposal of the International Railway to abandon its Sugar Street line in the city. According to the Mayor the railway claims to be losing \$103,000 annually in its Niagara Falls operations.

### Pickwick Operation Under New Control

The Oregon Public Service Commission recently revoked the permit of the Pickwick Stages of Oregon, after a serious grade crossing accident when one of the stages was struck by a Southern Pacific train. The through service between San Francisco and Portland has been continued upon the reorganization of the stage company under new management and policy.

The Pickwick Stages of Oregon was a separate company from the Pickwick Stages, Northern Division, Inc., which

## Tabular Presentation of Recent Bus Developments

Lines Started		
Name	Address	Route
O. C. Wright	Adel, Ia.	Adel to Des Moines
Reo Bus Lines Co.	Lexington, Ky.	Lexington to North Middletown, Ky.
Cisco-Breckenridge Bus Line.	Cisco, Tex.	Cisco to Breckenridge, Tex.
R. W. Johns	West Plains, Mo.	Rolla to West Plains, Mo.
Remley Bros.	Vandalia, Mo.	Troy to Vandalia, Mo.
Wayne Freeland	Houston, Mo.	Cabool to Ticking, Mo.
Head & Head	Temple, Tex.	Temple to Waco, Tex.
John Bopp	Ballwin, Mo.	Ballwin to Maplewood, Mo.
Cannonball Transportation Co.	Fort Wayne, Ind.	Huntington to Charleston, W. Va.
Lee & Donzelli	Yonkers, N. Y.	Fort Wayne to South Bend, Ind.
Yonkers-Bronxville Bus Line.	(Getty Square)	Yonkers to Bronxville, N. Y.
B. & O. Bus Line	Rimersburg, Pa.	Rimersburg to Chicora, Pa.
Olney Failing	Carthage, N. Y.	Boonville to Carthage, N. Y.
J. B. Bates	Greenup, Ky.	Greenup to Russell, Ky.
Edward J. Dorey	Corbettsville, N. Y.	Binghamton to Corbettsville, N. Y.
Permits Granted		
Name	Address	Route
French & Son	Stillwater, Okla.	Stillwater to Oklahoma City, Okla.
Royal Freer	Pleasant Valley, N. Y.	Poughkeepsie to Pleasant Valley, N. Y.
Nokomis Motor Bus Line	Pana, Ill.	Pana to Hillsboro, Ill.
Colorado Motor Ways, Inc.	Denver, Colo.	Denver to Nunn, Colo.
Bradley Davis	Minco, Okla.	Minco to El Reno, Okla.
A. C. Clay	Muskogee, Okla.	Muskogee to Fort Gibson, Okla.
F. Clay & Raymond Fisher	Nanuet, N. Y.	Nanuet to New City, N. Y.
F. P. Bunce	Perry, Okla.	Stillwater to Perry, Okla.
C. F. French & Son	Stillwater, Okla.	Stillwater to Perkins, Okla.
Wardway, Inc.	Muskogee, Okla.	Stillwater to Guthrie, Okla.
S. T. Harris	Pershing, Okla.	Muskogee to Tulsa, Okla.
Georgetown-Park Lane-Cherrydale Line	Clarendon, Va.	Pawhuska to Pershing, Okla.
James Robinette	Coeburn, Va.	Washington Country Club to Georgetown, Va.
A. W. McPherson	Poultsmouth, Va.	Coeburn to Fairfax, Va.
Peninsula Transit Corp.	Newport News, Va.	Poultsmouth to Cradoek, Va.
A. A. Johnson	Sterling City, Cal.	Lee Hall to Williamsburg, Va.
I. W. Shelters	Paterson, N. J.	Sterling City to Chester, Cal.
Wolf Bus Co.		Coldwater to Jackson, Mich.
Market St. Bus Line		Coldwater to Jackson, Mich.
Incorporations		
J. T. Farris	Fineastle, Va.	Coeburn, Va.
Claude Ownes	Churchland, Va.	Appalachia, Va.
Fawley's Bus Line	Broadway, Va.	Appalachia, Va.
O. E. and J. E. McPherson	Elizabeth City, N. C.	Front Royal-Winchester Bus Line
Petersburg-Surry Bus Line	Wakefield, Va.	Columbia Pike Bus Line
W. B. Jenkins & Bros.	Washington, Va.	Larkin Stanley, Jr.
Charles L. Pullen & G. W. Payne	Washington, Va.	J. D. Cotman & Son
Georgetown-Rallston Motor Line	Clarendon, Va.	Richmond-Rockville Bus Line
W. W. Fink	Castlewood, Va.	Vernon L. Richard
Hyde Car Line	Buchanan, Va.	Irvington-Warsaw Bus Line
J. F. Choplin	Portsmouth, Va.	Warren & Reedy Transfer Co.
Pullen & Payne	Front Royal, Va.	Goodman Brothers
Bernard M. Hague	Macon, Va.	Edgerton-Reo Bus Line, Inc.
W. T. Sullins & J. Sullins	Saltville, Va.	C. F. Coakley
Payton R. Williams	Floyd, Va.	Hampton Roads Transportation Co.
Buchanan & Roanoke Motor Line	Buchanan, Va.	Floyd Hack Line
Abingdon Transfer	Abingdon, Va.	Brent Bowman
Clarence W. Below	Crozet, Va.	R. C. Bowen & Temple Bowen
J. A. Anderson	Blacksburg, Va.	Snails, Inc.
Charles T. Cabell	Pedlar Mills, Va.	Bryan-College Interurban Co.
Coeburn Taxi Company	Coeburn, Va.	Elmira-Watkins Glen Transit Corp.
A. D. Warden	Mountain City, Tenn.	Consolidated Bus Corp.
A. A. Boothe	Tazewell, Va.	Fox Valley Coach Line
Charles City Bus Company	Barnetts, Va.	E. N. Betourne
O. K. Creasy	Blacksburg, Va.	Elizabeth, Linden & Rahway Bus Line
Packard Service Line	Bristol, Va.	Orange Valley Bus Co.
Alexandria & Suburban Bus Co.	Alexandria, Va.	Cornwall Public Service Corp.
W. M. Barnes	Christiansburg, Va.	Motor Bus Transportation Co.
Thornton Rose	Madison Heights, Va.	Southern Conservatory Bus Line, Inc.
R. W. Hogan	Roanoke, Va.	S. A. & W. Bus Line
Hasene Robinson	Castlewood, Va.	
Blue Ridge Bus Line	Galax, Va.	

operates from southern California to the Oregon line, and in recent years has been making joint schedules under an agreement with the Oregon company of similar name. The reorganized Oregon company is known as the West Coast Stage Line and is under the control of Charles F. Wren, president of the Pickwick Stages, Northern Division, Inc. Thus the Pickwick service will now be continuous under the same management and, in addition to local service rendered by the company in southern California, has under its immediate control the through route from the Mexican line to Portland, a distance of about 1,350 miles. The Pickwick company is one of the best-known bus operators on the Pacific Coast.

### New England City May Replace Trolley with Bus

A complete bus system may be installed in Nashua, N. H., as a result of agitation on the part of the residents of the city who claim that the Nashua Street Railway, operating there, cannot render adequate service.

A conference between the city authorities and the street railway management recently is said to have failed in making any substantial progress regarding the repair of the railway equipment. Residents of Nashua point to bus operation in Brattleboro, where conditions are similar.

Advocates of the bus say that buses would have two great advantages over

the present railway in that there are no long hauls in the city limits and that a belt line could be arranged unhampered by tracks. Moreover, the buses could load from the curb, an important factor in their favor downtown. The railway says funds are not available to improve the present condition of the track and equipment.

### Bus War Flares Up in Milwaukee

Milwaukee's bus war, which has been dormant for the last few weeks, has been renewed, following the application by W. T. Gridley, general manager of the Milwaukee & Suburban Motor Coach Lines, Chicago, to the Common Council for permission to operate buses over routes on which the Milwaukee Electric Railway & Light Company is now running.

The company recently withdrew from the bus field at Milwaukee, claiming that buses could not be operated in this city under present ordinances which limit permits to one year, since it gives too short a time to warrant great expenditures in the purchase of equipment.

Action to enter this field again was taken following a meeting in Chicago of the board of directors of the company, which decided to "continue the fight." Announcement is also made that this firm will be ready to commence operations within four months. It will probably ask for permission to operate two lines, one over Lake Drive and Wahl Avenue to Washington Park Boulevard, the other over Prospect Avenue, through the city on Michigan Street to Sixth Street, north to Prairie Street and thence to Twenty-seventh Street. These routes conflict in some instances with those over which the local railway is operating cars and buses, and it is around this point that the fight is expected to center when the Common Council considers the assignment of routes.

The line already established has proved to be a great convenience to patrons who must park cars at a distance from the shopping center.

### City Operates Buses

Municipally operated buses appeared recently on the streets of Oakland, Cal., to carry passengers over routes paralleling the electric railway lines at a rate of fare 1 cent lower than the trolley rate. This makes the bus fare 5 cents.

The city is negotiating with the Peerless Stage Company for a franchised bus service, it is said. A proposition to revoke the jitney prohibitory ordinance was defeated in the Council by a vote of three to two.

One twenty-nine-passenger Fageol bus is now in operation on Telegraph Avenue and two additional buses have been ordered. The Council has declared that as soon as funds are available more buses will be added.

The city, through its elected officials, is antagonistic toward the San Fran-

cisco-Oakland Terminal Railways. The dispute concerns the operation of one-man cars. The one-man cars have been officially banned by the City Council, but the railway has refused to comply with the order and continue to operate this type of equipment.

In the heat of controversy over the one-man cars, the matters of service and fares for the time being seem to have been relegated to the background.

**Merchants Use Buses to Solve Parking Problem.** Parking space for automobiles has become so difficult to find in the shopping district of Washington, D. C., that the largest department store in the national capital has started a bus service to connect its store with the area outside of the congested district. In this way patrons of the store may park their cars several blocks away from the store and complete the journey in the bus without the payment of fare. Merchants in the business center of Washington have been much concerned over loss of trade to outlying stores as a result of parking space being available at these latter establishments. There is even talk of co-operative action on the part of merchants to furnish free parking space in the nearest available open area, which would be connected with their establishments by a bus service.

**New Line Competes With Electric Railways.** The purchase of several buses to be used between Kansas City, Mo., and Excelsior Springs in the same state over the new paved highway was announced recently by McDavid Brothers of Excelsior Springs. The bus line will compete directly with the Kansas City, Clay County & St. Joseph Electric Railway line to the Springs. It was announced by McDavid Brothers that they will operate an hourly service with the opening of the highway, which will take place in December.

**Bank Installs Free Bus Service.**—Bus service was recently started by the Lafayette-South Side Bank, Broadway and Lafayette Avenue, St. Louis, Mo., to provide free transportation for patrons and employees between the bank and Grand Boulevard. If the plan is successful it will be extended to other sections of South St. Louis, according to officials of the company. There is no crosstown car line on the route traversed by the bus system, and it was found necessary to devise a means for transporting patrons and employees to the main artery of St. Louis' transportation system.

**Red Caps Serve Bus Patrons in Florida.**—The Florida Travel Bureau, operating bus lines in St. Petersburg, Fla. and vicinity, maintains a squad of uniformed porters to meet buses arriving in the city from Tampa, Jacksonville and Miami, to assist with baggage and conduct passengers to hotels. The service is conducted without charge. The White Bus Line, operating in the same territory, is planning to adopt a similar service soon, it is said.

## Financial Section

### Concourse Failure Brings "I Told You So!"

New York City Officials Call Attention to the Results of Private Operation of Bus Line

A voluntary petition for reorganization, was filed Oct. 8 in the Federal District Court, New York City, against the Concourse Bus Company, Inc., one of the bus lines operated wholly without a franchise. It has been granted a franchise by the Board of Estimate. Mayor Hylan, a member of the Board of Estimate, has been strongly opposed to granting franchise to private companies, preferring to let them operate under permit and supervision of the Department of Plant and Structures, although the courts have held that such operation was illegal.

The city officials found satisfaction in the result of the first experiment in franchise operation, as illustrated by the Concourse company. They were quick to say "I told you so." Commissioner Grover A. Whalen, of the Department of Plant and Structures, under whom the Bronx Concourse line operated for two years on a permit before it obtained a franchise, declared that it was a vindication of the Mayor's stand in the matter.

#### "ILLUSTRATES MAYOR'S POINT"

"This illustrates the point Mayor Hylan has been making right along," said Commissioner Whalen, "that operation by private companies under a city permit or franchise is not the proper way, and that municipal ownership and operation of buses is the only way."

The commissioner said that the private operators as soon as they obtained a franchise were inclined to fall back on the courts and fail to comply with their contracts with the city. In such a case, he declared, the city was helpless and unable to collect its revenue from the lines.

The Pure Oil Company, with a judgment claim of \$2,283, filed its petition. The judgment was obtained according to the petition, in the Supreme Court. As acts of bankruptcy, the petitioner alleges that the defendant company has recently paid \$2,000 to sundry creditors, with intent to make preferential payments, and that it has placed a chattel mortgage in excess of \$15,000 on some of its property. There is no mention of assets or liabilities in the papers.

#### OBTAINED FRANCHISE IN MAY

Emil Leino, former agent on route of the Bronx Concourse line, obtained a franchise, or a temporary revocable permit, as the city officials prefer to call it, from the Board of Estimate on May 1. His contract called for a

5-cent fare and the payment of 5 per cent of the gross earnings to the city at the end of each month. Some, if not all, of these payments have been made. Comptroller Craig, however, refused to acknowledge certain checks tendered to the city on the ground that they were not properly drawn. The only other line which operates under a franchise is the Nassau Bus Line, a small part of which is within the city limits. Most of this line is in Nassau County, but it runs to Far Rockaway, Lawrence, Long Island and the Rockaway beaches. A 5-cent fare is charged on the part of the line within the city limits.

In view of the repeated decisions of the courts that the operation of the bus lines through the Department of Plant and Structures was illegal, the New York Transit Commission has continually urged the Board of Estimate "to legalize" the various lines under city operation by granting franchises. Chairman McAneny, of the commission, has frequently referred to the Concourse Bus Line as an example of operation under franchise which should be followed in the case of the other lines.

## Detroit Bus Company Expanding

**Now Operating 125 Buses, with Twenty More Ordered—Conservative Profit Margin Maintained**

**G**RATIFYING expansion in the business of the Detroit Motor Bus Company, operating in Detroit, Mich., is indicated by figures recently issued by the company.

Bus miles operated in September, 1923, totaled 432,000, compared with a monthly average of 295,664 last year, 207,464 in 1921 and 51,944 in 1920. Buses in operation increased from twenty-two in 1920 to fifty-two in 1921, to seventy-four in 1922 and to 125, the present number. Further additions to the fleet will be made soon. Twenty more are ordered for delivery in February.

The company has extended the Dexter Boulevard line for thirteen blocks North from Joy Road to Burlingame Avenue, and the Lafayette Boulevard line North on West Grand Boulevard to and along a portion of Tireman Avenue.

Extensions to service are being made commensurate with the increased facilities. In many cases the improved service will result in an actual loss to the company, it is said. The length of ride is being extended, transfer privileges granted and new routes opened, all of which will add expenses out of proportion to earnings the new

## Detroit Motorbus Company—Condensed Balance Sheet, December 31, 1922

Assets		
Current and Working Assets:		
Cash on hand and in banks	\$69,609	
U. S. Liberty Loan Bonds, and war savings stamps (at cost)	80,248	
Stores and uniforms	30,590	
Accounts and notes receivable	21,335	\$201,782
Land Contract Receivable and Accrued Interest		7,085
Property Account:		
Land	\$79,073	
Buildings	78,601	
Transportation and service equipment	792,711	
Machinery and tools	16,326	
Operating office furniture and fixtures	4,754	
General office furniture and fixtures	2,533	973,998
Deferred Charges to Future Operations:		
Unexpired insurance	\$7,239	
Prepaid taxes, licenses, etc	9,554	
Improvements to leasehold property, less proportion written off	2,072	
Organization Expense—		
Original amount of \$66,548 less \$36,015 written off	30,533	49,398
Total assets		\$1,232,263
Liabilities		
Current:		
Accounts payable	\$34,049	
Accrued payroll and unclaimed wages	12,786	
Dividend payable Jan. 15, 1923	22,682	
Miscellaneous	326	69,843
Reserves for Depreciation:		
Buildings	\$3,686	
Equipment	196,985	
Machinery and tools	2,319	
Furniture and fixtures	2,178	
Reserves for Taxes:		
Federal income and profits taxes	67,500	
Reserves for Liabilities:		
Injuries and damages	64,235	336,903
Capital Stock:		
Authorized—150,000 shares of \$10 each		
Issued and Outstanding—75,569 shares of \$10 each	\$755,690	
Rights applicable to fractional shares	2,006	757,696
Surplus		67,821
Total liabilities		\$1,232,263

service will bring. But having established a comfortable earning power, the company has set itself the task of providing maximum service for bus riders, rather than allow the piling up of surplus, thereby assuring its position in the city's transportation system and avoiding political interference.

Notwithstanding its high earning power, the company operates on a narrow margin. Operating costs, including overhead, average 9 1-27 cents for each 10-cent fare, or 30 cents a bus-mile. Operating expenses must therefore be watched with vigilance. As an example, when the city decided to impose a tax of one cent a bus-mile, the company found that it could meet the added tax burden by lengthening

the buses to provide two additional seats on each deck, thus increasing capacity from fifty-two to fifty-six passengers with scarcely any increase in operating costs.

The company was organized in 1920. The stock was brought out then at \$10 a share and is now quoted around \$30. While officially on an annual dividend basis of 8 per cent recent extra disbursements have brought the rate to 12 per cent as six consecutive extra cash dividends have been paid with the regular quarterly dividends. Cash disbursements on the stock outstanding on the various dividend dates total 21½ per cent. In addition stock dividends of 10, 25 and 20 per cent have been paid.

## Brattleboro Operation Profitable

Bus operation in Brattleboro, Vt., is destined to be highly successful from every point of view, according to figures recently issued by the Twin State Gas & Electric Company, which replaced its trolley line with buses there the latter part of August.

Receipts for the month ended Sept. 25 were 33 per cent greater than the corresponding period of trolley operation last year and the number of passengers carried was greater by nearly the same per cent. The cost of operation of the buses for the first month was about 9 per cent over that of the trolley system, although operation costs of the electric railway line did not include the item of depreciation, which has been included in bus line expenses.

The first month figures are based on the period beginning Aug. 29 and ending Sept. 25, inclusive. The receipts were \$1,824.61, as against \$1,084.80 for the same period last year. The bus line expenses were \$1,680.03 compared with \$1,451.83 entailed by the old trolley cars, so that the first month of bus operation shows a net profit of \$144.58, as compared with a loss of \$367.03 for the electric railway.

During the first month 20,212 passengers were carried, while during the same period last year the old street cars hobbled along with 14,302 fares. This fact is especially interesting because the bus line fare is 10 cents, as against 8 cents on the street cars, and despite the 2 cents increase, nearly one-third more passengers were carried. The buses have been operated on a thirty-minute schedule, which has proved satisfactory during the first month. Not one trip has been skipped and every trip has been made on schedule time.

Twin State officials have said they are gratified over the reports of the first month and feel that future reports during the fall and winter will be equally as good if not better, owing to the fact that more passengers are carried in the fall, winter and spring than during the summer season. They point out that there is no doubt as to the popularity of the bus line as is indicated by the great increase in the number of passengers carried.

## Operating Figures, Detroit Motor Bus Company

	Average Number Buses Operated	Total Trips	Miles Operated	Passengers Carried
June 11, 1920, to Dec. 31, 1920, inclusive	22	65,140	623,335	2,335,475
Jan. 1, 1921, to Dec. 31, 1921, inclusive	52	224,364	2,489,571	9,135,605
Jan. 1, 1922, to Dec. 31, 1922, inclusive	74	329,874	3,547,946	14,322,026
		619,378	6,660,852	25,793,106



# Bus Regulation



## Ohio Enforcement Progressing Slowly

Applications for Permits Filed Number 1,500 and 2,000 More Are Expected — Bus Inspector Appointed

ENFORCEMENT of the Freeman-Collister law in Ohio for the licensing and control of buses is just beginning, considerable delay having been experienced by reason of the fact that the State Board of Control refused to grant the Ohio Public Utilities Commission an appropriation of \$50,000 in July to provide the necessary enforcement officers.

Also, in view of the fact that under its provisions the Freeman-Collister law is expected to bring at least \$1,000,000 into the state treasury each year from the operators of buses, loss of license fees for the third quarter of the year 1923 mounts into thousands of dollars.

Herman A. Shafer, Bridgeport, Ohio, has been appointed chief inspector. He entered upon his duties Oct. 18. The Board of Control has granted an appropriation of \$15,000 for the purpose of starting the work. An assistant inspector, a stenographer and four district inspectors will be appointed at once. It is planned to have all sections of the state thoroughly covered, making assured that all companies operating passenger or freight buses over the highways shall make application for certificates of convenience and necessity.

More than 1,000 applications from bus companies are on file with the commission. Some of these are for new lines, and others for lines which were operating on the date when the Freeman-Collister Act became effective. The latter, according to the Act, need only file affidavits with the commission, giving the details of their operation. The commission has already granted certificates to nine of these, and has indicated that all such lines will be granted certificates provided no protests are raised.

It is estimated that more than 2,000 motor bus companies will yet file applications as required by the law. Inspectors to be started out at once are expected to report delinquents. Penalties are prescribed for failure to obey the law. J. B. Dugan, acting secretary of the utilities commission, declares that there should be an appropriation for ten instead of only four district inspectors.

The chief inspector will receive a salary of \$3,000 a year. Moneys derived from licenses issued will be divided among cities and counties wherein the buses operate and the state highway department for road maintenance, after cost of the administration of the law has been paid. Under the circumstances, with reduced appropriation

granted for enforcement, it has become necessary for the commission to call upon officials of cities and counties for assistance in the matter of enforcement.

The Common Council of Cincinnati is expected to repeal the ordinance levying a tax of \$12 on buses operating in the city. This action will be taken, it is said, because of the state license fee included in the Freeman-Collister Act. Other Ohio cities are expected to take similar action in repealing or waiving bus tax measures.

## Seek to Block Bus Lines in Iowa

Four railroads and two interurban electric railway lines operating out of Mason City, Iowa, have filed objections with the Iowa Railroad Commission seeking to prevent the issuance of a bus line certificate to Miss Helen Schultz, a twenty-four-year-old Mason City girl.

Miss Schultz operates twenty-four buses out of Mason City, some going as far north as St. Paul and Minneapolis and others as far south as Des Moines.

Under a recently enacted statute a certificate of operation must be secured from the State Railroad Commission before buses may operate over the public highways of Iowa. Miss Schultz has been running her buses for many months under a temporary permit. Through the efficiency of operation maintained by Miss Schultz the buses have been gaining increased patronage steadily and have proved to be serious competitors for the protesting railroads and interurbans.

The protesting companies include the Chicago & Northwestern; Chicago, Rock Island & Pacific; Chicago Great Western and the Minneapolis & St. Paul railroads, and the Fort Dodge, Des Moines & Southern and the Mason City & Clear Lake interurban lines.

## Commission Refuses to Act

The Missouri Public Service Commission, on Oct. 13, declined to assume jurisdiction over the People's Motor Bus Company of St. Louis, which had petitioned the commission for authority to operate five additional bus lines in the city of St. Louis. The commission took the position that it was without legal authority to control bus lines.

A. D. Norton, counsel for the bus company, indicated that he would file mandamus proceedings in the Missouri Supreme Court to compel the commission to issue the permit sought. The People's Motor Bus Company plans to open new lines on Grand Boulevard, Lindell Boulevard, the Municipal Bridge, Twelfth Boulevard and in the downtown district. The company has entered upon its fall and winter schedule. The Washington-Delmar line, which operates between the Eads Bridge and University City, runs on a five-minute instead of a six-minute schedule. During the winter the Forest Park service will be maintained only on Sundays from 9 a.m. until dark.

## Michigan Board Issues Bus Rules

Speed Limit Set at Forty Miles an Hour—No Racing Allowed—Overloading Prohibited.

BUSES carrying more than 20 passengers shall not be permitted to travel at a speed exceeding 30 miles an hour, except in an emergency, according to the new Public Utility Commission rules.

Another new regulation prohibits any motor vehicle from carrying more than one passenger for each seat. Part of the regulations are:

"No common carrier motor vehicle shall be operated by any person who is sight or defective, or who is so intoxicated that he is not fully in command of both legs and feet, or who is so intoxicated that he has been engaged within a reasonable time of driving with the use of drink, or of driving while intoxicated.

"No common carrier motor vehicle shall operate at any time at a speed greater than 30 m.p.h.

"Motor vehicles carrying passengers shall not carry more than one passenger in the front seat and the driver's seat of such vehicle shall be operated from the front seat.

In cases where the front seat of the vehicle is 54 inches wide, two passengers may be carried in the front seat, and, where the front seat is wider than 54 inches, an additional passenger may be carried for each additional 18 inches of width.

"Where a minimum fare is established, such minimum fare shall not in any case be in excess of 10 cents.

"At no time shall any vehicle used as a motor vehicle common carrier, engage in any race upon the public highways.

"No applicant to whom a permit has been issued under this act shall at any time carry property to a value greater than the amount covered by his insurance filed with this commission, nor persons in a number greater than the number insured under his insurance, proof of which is filed with this commission."

## Schenectady Jitney men Sentenced

Sentences have been imposed on several jitney men in Schenectady, N. Y., charged with violating an injunction granted the Schenectady Railway in restraint of illegal competition by the Supreme Court Justice Edward M. Angell at Ballston Spa, Oct. 1. The jitney men were charged with carrying passengers in Schenectady in competition with the street railway during the recent strike strike.

Fines were imposed ranging from \$10 to \$25, with some men a number of operators were dismissed. Among those fined \$25 were John J. Gonyea, who told the court he was a Polish priest and said he did not understand the injunction. The fine will be remitted provided he sells his automobile within five days. Jail sentences of ten days were also imposed on a few operators.

# Personal Notes

## An Engineer-Operator

F. D. Howell, Advocate of Responsible Transportation, Is a Leader Among California Bus Men

SOME ten blocks away from the famous Union Stage Depot in Los Angeles, in new offices of the Motor Transit Company, F. D. Howell, assistant general manager of the company, holds continuous court. It matters not, apparently, that the offices, with which are connected the company's garage and maintenance station, are off the beaten track, for those who need advice seek out Mr. Howell.

His office looks much like that of a lawyer, with books everywhere, and a long work table near his desk. It gives

transportation. And this change came after a brilliant career with the railroads. For nearly ten years he was civil engineer for the Pennsylvania Railroad, the West Virginia Central, the Meriden, Waterbury & Connecticut River Railroad, and for several years was engineer and general superintendent for prominent contracting companies in New York and Philadelphia, having charge of the construction of water works, buildings, railroads, highways, hydro-electric plants, fortifications, coaling stations and many government structures in the Eastern states. His first work in the West was also for a railroad, the Pacific Electric of Los Angeles. For this company he constructed a large part of the present extensive system.

### LEAVES RAILWAY TO ENTER BUS FIELD

Just three years ago Mr. Howell joined what was then the White Bus Company as assistant general manager. The company has since changed its name to the Motor Transit Company, and through the years of Mr. Howell's association it has grown to be one of the largest operating companies in the country, running 125 cars in local and through service over some 800 miles of highway radiating out of Los Angeles in all directions.

Mr. Howell is considered one of the best traffic experts in the country along all transportation lines, and is a valued member of the Motor Carriers' Association. He is a sort of *dux ex machina* of the association, having served on the board since 1919, and directed the formation of its policies with great care. He has been secretary, general manager and vice-president during this period and has served on the legislative committee continuously.

### LEGISLATION WILL DEVELOP BUS INDUSTRY

Mr. Howell believes that it is in legislation concerning motor transportation that the greatest aid may be rendered the industry. His work as a member of the legislative committee of the association has been an expansion of what he did as a member of the Los Angeles Utility Board. Methodical, orderly, progressive, he is a man whose opinions are valued and whose advice is sought by the industry in and out of the state. He accomplishes much, because he has the vision to see what he is going after. He knows, moreover, how to go about it efficiently. For this reason he is one of California's leading men, known wherever buses run.



F. D. Howell

evidence of his interest in the bus business since it was in the jitney stage of development. In 1915 Los Angeles put the control of the dilapidated, overcrowded jitney into the hands of the Board of Public Utilities. Mr. Howell was chief engineer of the board, and judging by his energy and the intellect which sparkles through his cool eyes he was, as the old darkey said at the 'possum hunt, "The main ring leader of that 'ere" utility board. For four years Mr. Howell was the moving spirit among the motor transportation men, urging them to organize into companies and to give regular and responsible transportation.

As in the movies, we can jump quickly over four years to 1919, when Mr. Howell resigned from the Public Utilities Board to serve as general manager and secretary of the Motor Carriers' Association. With this step he definitely announced that his affections were once and for all with motor

## Highway Expert to Visit America

Sir Henry Maybury, the British road authority, has been invited by the American Association of State Highway Officials, the Highway Education Board, the American Road Builders' Association and the Highway Research Council to come to the United States to discuss plans for the proposed English-speaking road congress, which it is hoped to hold in the United States in 1926.

Some of those who attended the congress in Seville this year were convinced that more headway could be made at an assemblage of that character when a common language could be used. There is said to be great similarity between the road problems of English-speaking countries.

## Mr. Lee Joins Fageol Forces

Gordon Lee lately joined the forces of the Fageol Motors Company as manager of the Ohio division, which is now known as the Fageol Motors Company of Ohio. He is well known in automotive circles as former chief of the Automotive Division of the United



Gordon Lee

States Department of Commerce. He was selected for the position with the Hoover organization by the National Automobile Chamber of Commerce and the other principal trade bodies of the automotive industry. The business career of Mr. Lee was reviewed in an article published in the issue of BUS TRANSPORTATION for January, 1923.

## Mr. Brush Enters Motor Field

George S. Brush, for the last five years superintendent of transportation of the Houston Electric Company, has resigned to go to New York, where it is announced that he will become associated with the International Motor Company.

Before going to Houston Mr. Brush was connected with several electric railways in New England, where he entered the railway field in 1908. He was born in Stillwater, Minn., in 1884.



## Bus Insurance Firm Aids Ohio Operators

Ohio Motor Mutual Finds Real Demand for Service—Only Bus and Truck Business Written

**B**US insurance resulting in premiums of more than \$75,000 has been written by the Ohio Motor Mutual Insurance Company of Cleveland since it was licensed on Aug. 8, 1923, according to officials of the company.

Formed for the benefit and convenience of Ohio bus owners as a result of the insurance clauses in the Freeman-Collister act regulating bus operation, this company has witnessed a very satisfactory vindication of its belief that a real demand exists for the kind of service it renders.

Buses and commercial trucks alone are insured. Private passenger car business is not accepted. Premiums are payable quarterly in advance and are 25 per cent below conference rates.

The president of the new organization is M. E. Blackburn. Mr. Blackburn is also a director of the Ultimate Bus Company and vice-president of the Ohio Motor Bus Owners' Association. R. E. McCollum, president of the Bus Owners' Association is vice-president of the insurance company. Clark T. McConnell is acting secretary-treasurer. He is also a director of the Cleveland-Ashtabula-Conneaut Bus Company and the Elyria-Toledo Bus Company. The directors of the Ohio Motor Mutual Insurance Company are as follows: R. W. Sanborn, secretary Cleveland-Akron Bus Company; O. C. Frantz, secretary Ultimate Bus Company; C. J. Randall, secretary Ohio Motor Bus Owners' Association; H. H. Moore, general manager Cleveland-Akron Bus Company; F. J. Schmidt, president Ohio Association of Commercial Haulers and the Liberty Highway Company of Toledo; F. W. Stacey, William Stacey & Sons, commercial haulers, Cincinnati; H. E. Hollinger, treasurer Cleveland-Lorain-Sandusky Bus Line; A. F. Amor, president A. F. Amor Motor Trucking Company, Cleveland; D. E. Edwards, Edwards Transfer Company, Columbus; William E. Hunger, secretary Knutsen Motor Truck Company, Cleveland.

Offices are at 510 Hippodrome Building, Cleveland. The law firm of Sanborn, McConnell & Marsteller serves as counsel for the new company.

## Rolling Stock

Oscar O. Luebke, Wisconsin Rapids, Wis., operating a bus to Iron, recently purchased another Menominee twenty-passenger bus.

Carthage to Springfield, Mo., Bus Line, operated by R. A. Macfarlane, recently added a twenty-two-passenger de luxe coach to its equipment.

D. Palaio, 129 Garfield Avenue, Long Branch, N. J., operating the Long Branch-Asbury Park line, has purchased two Mason buses of twenty-two passenger capacity.

Ashland-Wooster, Ohio, Bus Line, operated by Mathews & Foekler, recently added a nineteen-passenger bus to its equipment. The new bus has a Dodge Brothers chassis, equipped with a special Graham Brothers Body.

W. M. Aldrich, Syracuse, N. Y., and W. R. Collins, Mill Brook, N. Y., each recently installed a twenty-two-passenger Fageol coach on his line.

Beaver Falls-East Palestine, Pa., Bus Line, operated by Robert Sanders, recently added a twelve-passenger Studebaker bus to its equipment.

A. H. Greenwaldt, Mount Horeb, Wis., recently put into operation a twenty-passenger Packard bus on his route running between Mount Horeb and Madison, Wis.

John Doozelli, Madison, Wis., operating between Madison and Prairie du Sac, Wis., has added a twenty-four-passenger Fageol bus to his equipment.

Herman Maier, New Glarus, Wis., has added a Cadillac touring car to his bus line equipment operating between Monroe and Madison and intervening cities and towns.

York-East York (Pa.) Bus Line recently put into operation a twenty-passenger bus. The chassis was constructed by the Atlas Truck Corporation; the body was designed and built by the Hoover Body Company.

West End Transportation Company, Mount Horeb, Wis., recently added a twenty-passenger Stoughton and a twelve-cylinder Packard bus to its equipment. They will be placed in the Madison-Dubuque, Iowa, service.

Doty, Carlson & Doty, Green Bay, Wis., owners of the Green Bay-Marquette Motor Bus Line Company, recently put into operation a fourteen-passenger Reo bus on its line running between Marinette and Green Bay, Wis.

Inter-city Bus Line, Dover, N. H., recently received a new Reo bus to be used on the line between Dover and Portsmouth, N. H. The bus is equipped with a body built by the Westworth Body Company, Haverhill, N. H. It will seat eighteen passengers.

Motor Bus Line Company, Chippewa Falls, Wis., has purchased two eighteen-passenger White buses which it plans to install on its route between Eau Claire and Chippewa Falls to meet the demands of increased business.

David Greeson, manager of the Motor Bus Transportation Company, Indianapolis, Ind., has announced that he recently put into operation a fleet of 2-ton White buses of twenty-four-passenger capacity which will run regularly from Indianapolis to Kokomo. This will make the nineteenth bus line operating out of Indianapolis to towns within a 50-mile radius.

H. M. Myers, State College, Pa., who operates a bus line between State College and Tyrone, a distance of 23 miles, recently purchased a Fageol street-car type bus. The seating arrangement of the bus differs from the standard in that the seats will be a little wider and will all face forward instead of having cross seats over the rear wheel housings. Mr. Myers has operated this line for the past seven years. His buses carry about 35,000 college students as passengers annually. He is also building a \$50,000 two-story garage in the town of State College. The lower floor will be used for housing buses and for making repairs on them. The second floor will be devoted to providing recreation for employees and will include bowling alleys and a billiard room.

## Garages and Shops

Peachontas Transportation Company, operating in West Virginia, is constructing a \$10,000 garage in Northfork. The building will be one story in height, 40x90 ft. in size and will be capable of housing twenty-seven buses.

West Orange-Newark, N. J., bus men have announced their intention of erecting a \$60,000 terminal garage. Property has been purchased on Mississippi Street, near Harrison Avenue, West Orange, and construction will begin at once. The building will include offices for the West Orange-Newark Bus Association and a waiting room for passengers.

United Electric Railways, Providence, R. I., recently moved its entire bus equipment into the new garage just completed on Melrose Street. The building is 249 ft. long, 88½ ft. wide, is two stories high in front and has a maximum ceiling height of 21 ft. It has a capacity of fifty cars, and has six sliding doors, which permit rapid exits of buses for early morning pull-outs. The plant has a 10,000-gal. gasoline tank and a 1,000-gal. oil tank, and the building is heated by fuel oil.

Reo Bus Lines Company, Lexington, Ky., of which E. R. Webb is manager, is about to erect a new garage for storage and maintenance for twenty buses.

Turnbull Garage, Troy, Mo., is being constructed by Owen Turnbull, operator of a bus line in Troy and vicinity. It will be built of brick and tile and will afford garage space for new equipment which Mr. Turnbull expects to purchase in the near future.

## Business Notes

Pennsylvania Motor List Corporation, Harrisburg, Pa., has just been awarded a contract by the State Highway Department of Pennsylvania, giving it the exclusive legal rights to the official list of all owners of motor vehicles in that state. For the past two years such a list has not been available and it is awaited with much interest by all direct mail advertisers.

Charles H. Kramer & Company, Mishawaka, Ind., manufacturers of bus bodies have been put into the hands of the Farmers' Trust Company of South Bend, Ind., as receiver.

General Motors Chemical Corporation recently announced that it has signed a contract with the Standard Oil Company of Indiana for the distribution of ethyl gas, the new fuel developed by the General Motors Research Corporation. The new product, mixed and ready for use, is said to be on sale at filling stations in the Middle West at a price 4 cents higher than the prevailing price of gasoline, and it is expected that it will be procurable at stations in all parts of the country soon.

Cline & Hicks Company, Lebanon, Ind., manufacturing auto tops and bus bodies, has been dissolved. John Cline has retired from the firm because of ill health. Earl Hicks has taken over the body factory, which will be known as the Hicks Bus Body Company. He will discontinue the other lines of work formerly done by the firm, such as repairing and the making of auto tops, and will devote his entire time to the manufacture of buses. The company has been putting out from ten to fifteen buses a month, it is said.

Transit Equipment Company, 501 Fifth Avenue, New York City, announces through R. W. Marshall, president, that it will carry a complete line of new and used buses, bus bodies, fare-registering devices and bus accessories, selling exclusively to the electric railway field. This branch of the company's business is under the direction of V. C. Ealey, who was formerly connected with such bus manufacturers as the Vreeland Motor Company, Inc., American Motor Truck Company and the Garford Motor Truck Company.

## Advertising Literature

Westinghouse Air-Spring Company, New Haven, Conn., has issued a thirty-two page booklet entitled "Air-Spring Suspension in Commercial Motor Service." This takes up bus and truck applications; working principles of the device are explained and the installation service provided by the company described.

New York Transportation Company, builders of Fifth Avenue buses, New York, N. Y., has published a sixteen-page pamphlet entitled "A Fifth Avenue Transportation System for any Community." This gives specifications of the three models of Fifth Avenue buses and also shows how they can be applied in modern transportation systems.

Hale & Kilburn Corporation, 1800 Lehigh Avenue, Philadelphia, Pa., recently issued a folder descriptive of the Hale & Kilburn seats for motor buses. Three types of seats are shown—the modified spring cushion with comfortable pitch, whereby 1½ in. of space more than usual is secured for the knees of the passenger; the special seat designed particularly for medium grade buses, where greater comfort is desired, and the de luxe, for use in buses where special comfort is required.

Brown-Lipe Gear Company, Syracuse, N. Y., has just issued a bulletin containing complete instructions for adjusting the taper roller bearings used on Brown-Lipe gear transmissions. The bulletin recommends a first inspection after the vehicle has run from 800 to 1,500 miles, and inspections thereafter at each 5,000 miles of travel. Adjustments should be made, if necessary, after each inspection. Readers of BUS TRANSPORTATION can get a copy of this bulletin free upon request to the manufacturers.

Consulting Editor

The annual subscription rate is \$2.00 in the United States (Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, China, Szechwan, Hongkong, India, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Portugal, Costa Rica, Ecuador, Guatemala, and Paraguay). Extra foreign postage in other countries \$1.00 (total \$3.00 or 13 shillings). Subscriptions may be sent to the New York office or to the London Office. Single copies, postage prepaid, in any part of the world, 25 cents.  
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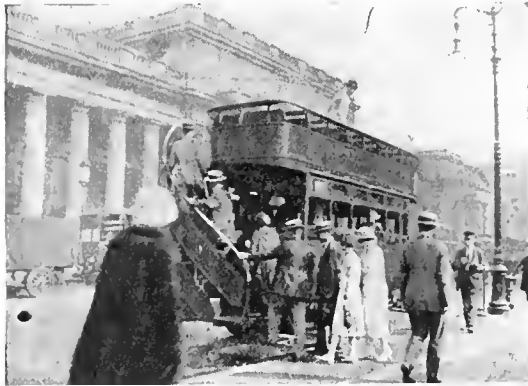
# Operation!



Public safety in congested traffic districts is always a primary consideration.



One-man Model J Buses are in constant service between Pennsylvania Station and Wanamaker Terminal in New York.



Passengers stand in line to ride on Fifth Avenue Buses because they afford attractive, comfortable service.

## Fifth Avenue Buses



### Safety First!

Over fifty-five million passengers per year ride in Fifth Avenue Buses in New York City. Millions more use them in other cities. Their record for safety is unsurpassed. Good brakes, easy steering, quick-turning and low center of gravity are the *practical results* of our fifteen years operating experience.

### Economy all the Time!

Any factory can build buses for someone else to operate. We actually operate our own and have done so for years. That's why Fifth Avenue Buses are *built right* from the operator's standpoint. Lowest gas and oil consumption, quick on the stops and starts, minimum repair bills—these items are developed with maximum efficiency in Fifth Avenue Buses.

### Business Building Buses!

What brings passengers to any transportation system? First, speed with safety; next, comfortable riding qualities, and finally vehicles which appeal because of their attractive appearance. Compare Fifth Avenue Buses with anything else on the road. Compare them under service conditions on the road,—not in the show-room of the dealer.

*Results count:*—Fifth Avenue Buses are showing the results.





# Maintenance!



## Standardized Construction and Unit Assembly with Interchangeable Parts Make Easy Work of Maintenance

Less time in the shop means more time on the route—*earning revenue*. Fewer vehicles are needed as spares, where Fifth Avenue Buses are used, because the principal assembly units, engine, clutch, transmission, propeller shaft, wheels, axles, steering gear and radiator are all *quick-detachable* and *interchangeable*. When a bus comes in with trouble in any of the parts a spare unit can be substituted in a brief period and the vehicle returned to revenue-producing service.

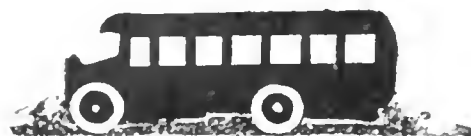
Fifth Avenue Buses and all their parts are standardized, for the utmost simplicity and economy in maintenance and repair problems. Your own garage is your service-station. Body construction designed to localize damage in cases of collision. Brakes adjustable from the outside. Clutch adjustment also is accessible.

Consider well, these practical features when choosing buses for efficient and economical service.

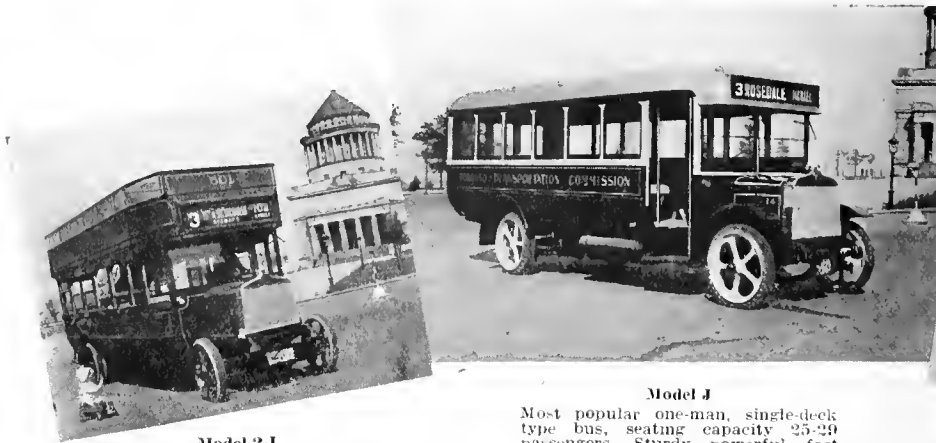


## Fifth Avenue Buses

**NEW YORK TRANSPORTATION CO.**  
*New York, N.Y.*



# Investment!



**Model 2-L**  
Largest Fifth Avenue Bus—  
built—61 seats, for heaviest  
city service.

**Model J**  
Most popular one-man, single-deck  
type bus, seating capacity 25-29  
passengers. Sturdy, powerful, fast  
and inexpensive.

**Model L**  
Standard double deck bus—  
51 seats—as used in our  
regular New York City serv-  
ice.



**Detachable Upper Deck Cover**  
Permits year round use of full seating capacity of  
double deck buses.

## Fifth Avenue Buses

### Prices Compare Favorably!

Get quotations on Fifth Avenue Buses before making any final plans for service. Remember that Fifth Avenue Buses are fully equipped ready to run. Remember that with Fifth Avenue Buses goes the service, prestige and reputation of a bus company of fifteen years standing. Remember that you are going to get low operating costs, minimum maintenance expenses and an unusually small depreciation factor.

An investment in Fifth Avenue Buses is a paying one. Companies in many cities throughout the Country have made the investment.

Fifth Avenue Buses are being used in cities in ten states, the District of Columbia and in Canada.



# Depreciation!



Stops and starts by the thousand in the busiest streets in America, yet these oldest Fifth Avenue Buses are running as efficiently today as ever.

## Years and Years of Service

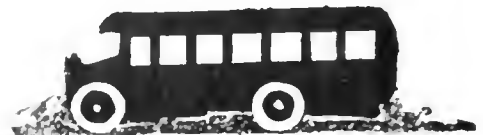
The ultimate life of a Fifth Avenue Bus is yet to be determined. Years ago we built our first lot—forty of them!

They still are running in every-day service! These buses on an average have each operated more than 225,000 miles, or the equivalent of nine times around the earth.

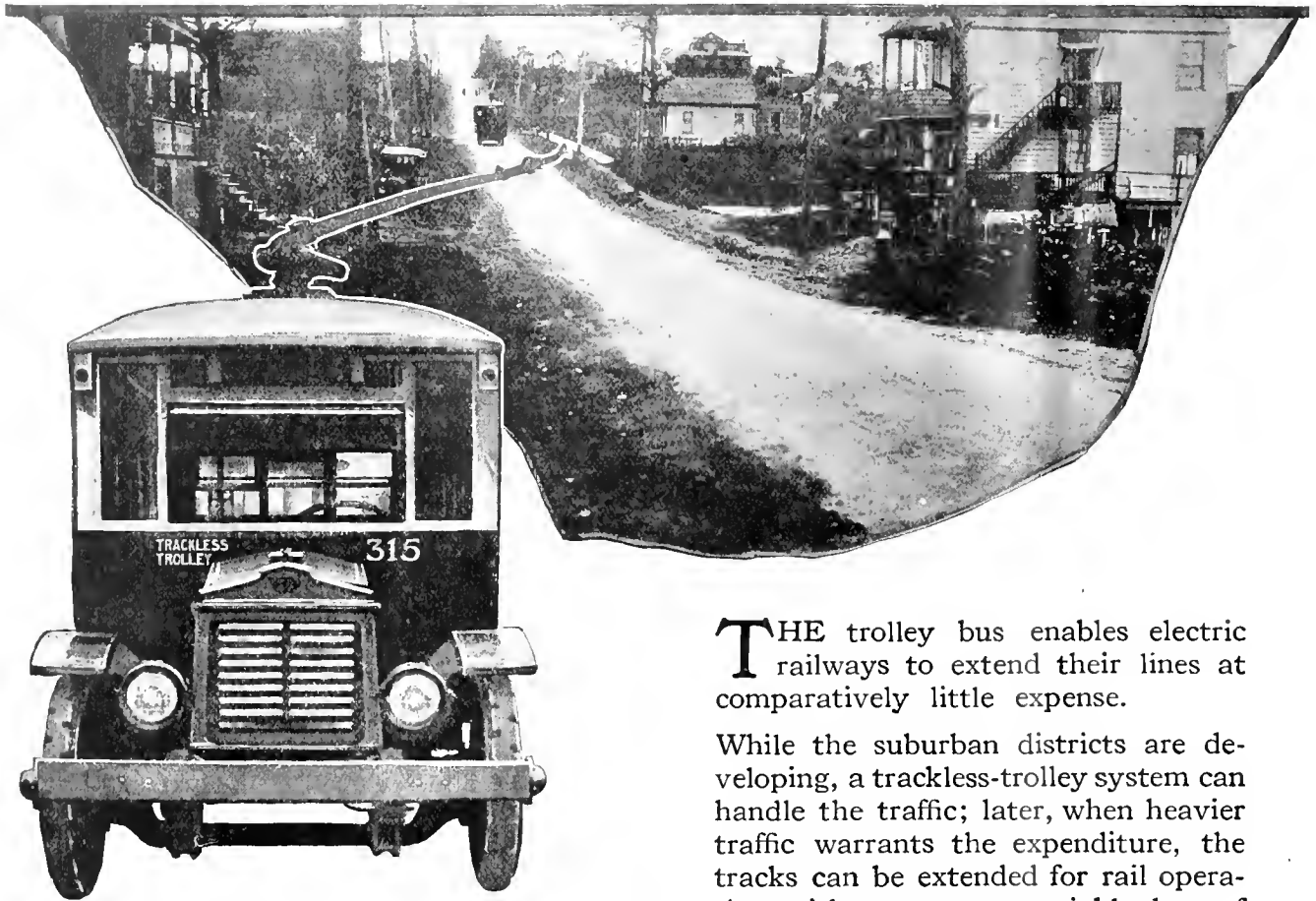
Fifth Avenue Buses are long life buses. Simplified maintenance methods stave off depreciation.

Let us send you full details about Fifth Avenue Buses including our illustrated Catalog "A Fifth Avenue Transportation System for Any Community."

## Fifth Avenue Buses



# The Forerunner of the Rail Line



**T**HE trolley bus enables electric railways to extend their lines at comparatively little expense.

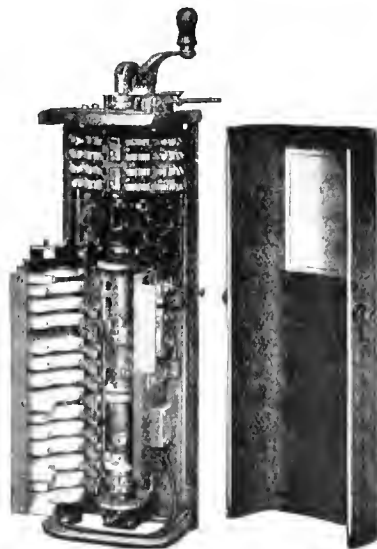
While the suburban districts are developing, a trackless-trolley system can handle the traffic; later, when heavier traffic warrants the expenditure, the tracks can be extended for rail operation without any appreciable loss of capital invested.

The successful operation of trackless-trolley buses deserves the attention of executives of every electric railway serving a growing community.

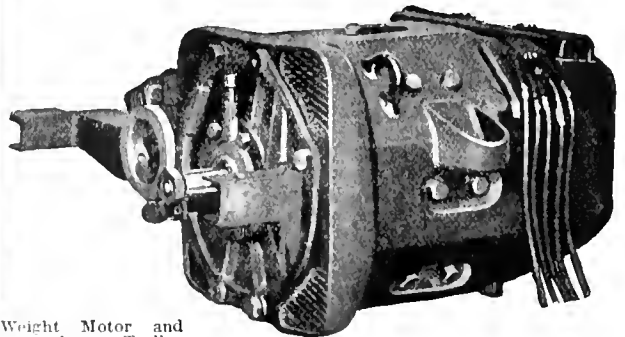
**General Electric Company**  
Schenectady, N. Y.  
Sales Offices in all Large Cities



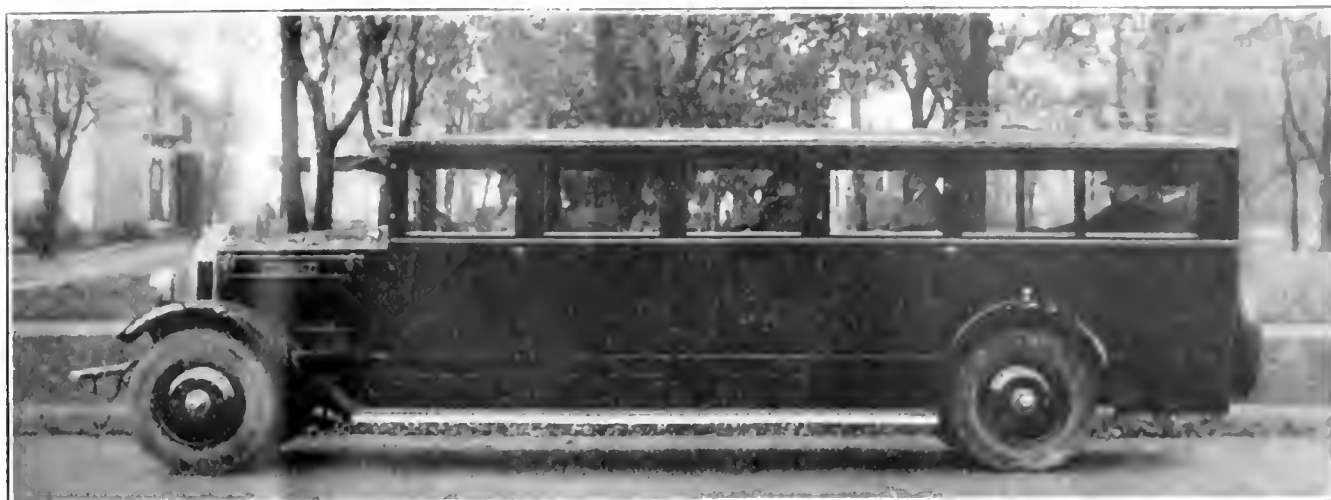
The GE-258 Motor, which has proved itself especially in light-weight, one-man cars, was the logical motor to drive the first trolley bus in this country. It is well qualified for this service also.



GE-258 Light Weight Motor and K-63 Controller used on Trolley Buses in New York City



# GENERAL ELECTRIC



There are ten sound reasons  
for the high earning power of a  
**CLYDESDALE COACH**

- 1—DESIGN—built solely for motor-coach service; especially fitted to its work.
- 2—LOW OPERATING COST—insuring a higher NET.
- 3—ABSOLUTE RELIABILITY—protecting patronage.
- 4—LONG LIFE—safeguarding the investment.
- 5—APPEARANCE—Deluxe design; attractive to riders.
- 6—COMFORT—passengers delighted with its riding qualities.
- 7—SAFETY in SPEED—low center of gravity; large brake surface; two sets on rear wheels; one set on front.
- 8—POWER—6-cylinder motor; ample power, not wasteful; smooth, rapid acceleration.
- 9—STRAIGHT FRAME—long, low frame, without a kick-up; perfectly straight-lined drive.
- 10—NOT EXPERIMENTAL—built by an old-established and experienced company.

*Full Information on Request—Prompt Deliveries*



THE CLYDESDALE MOTOR TRUCK COMPANY, Clyde, Ohio, U. S. A.



## Over One-Half the Busses Operated by Electric Railways are Whites

One hundred electric railways throughout the United States are operating approximately 900 motor busses in city and interurban service to supplement electric traction. *It is a significant fact that over one-half of the busses operated by electric railways are Whites.*

White predominance in the bus field is nation wide.

47 electric railway lines operate 476 White busses.

23 repeat orders were placed by electric railways for White busses within the last year.

More than 5,000 White busses are in use—more than of any other make.

Excepting certain types in New York and London, the largest bus fleets in the world are White.

100,000, 200,000 and 300,000 miles are not unusual mileages for White busses.

### *Electric railways operating ten or more White busses:*

The Northern Ohio Traction & Light Co.	40	Public Service Railway Co.	23
Milwaukee Electric Railway & Light Co.	62	The Connecticut Co.	16
Pennsylvania & Ohio Electric Co.	17	United Electric Railways Co.	13
Youngstown Municipal Railway	24	Los Angeles Railway Co.	10
Washington Railway & Electric Co.	11	Louisville Railway Co.	12
Chicago, North Shore & Milwaukee R. R.	18	Newburg Public Service Corp.	10
Boston Elevated Railway	14	Northern Transit Co.	11
Pacific Electric Railway Co.	71	Saginaw Transit Co.	14

*Bus and railway companies prefer White Busses because they are built to meet the most exacting requirements of passenger transportation. Full specifications, delivery dates, etc., on request.*

THE WHITE COMPANY, Cleveland

# WHITE BUSSES





# BUS TRANSPORTATION



New York, December, 1923

## Frontages on Intersecting Streets Yield Unique Bus-Rider Facilities

At the new Union Motor Stage Terminal in Cleveland, Ohio, passenger convenience meets operating economy. Reason is waiting room is on main business thoroughfare, while garage is built on side street, where property is much less expensive. Buses driven from garage by way of private passage to loading platform at side of waiting room. Maps painted on front windows help to build business. Garage building and equipment all of most up-to-date type.



Waiting room on East Ninth Street, Cleveland. Names of buses along center shown on two main windows. At right, the protected loading platform

WITH the completion early in November of the waiting room concession features, the finest bus headquarters east of the Mississippi, and that also means east of the Rocky Mountains, is in full operation, providing facilities for lines handling some 200,000 passengers per month, with sixty-five buses of up-to-date construction over more than 500 miles of Ohio highway.

The Union Motor Stage Terminal, as this development is known, serves as the real headquarters for the Cleveland-Akron Bus Company and for associated bus organizations operating in the northern and central parts of the state. Here the administrative offices of the various companies are located. Here are adequate accommodations for waiting passengers and convenient loading and unloading facilities. Here is a large modern garage, put up within the last few months, with complete facilities for storage, inspection and repair of bus equipment. The two terminal buildings were put up by the Cleveland Mortgage Company and represent a total investment of about \$200,000. They are under the supervision of H. H. Moore, general manager Cleveland-Akron Bus Company,

as are also the lines described in the table on page 558.

In the last two years Cleveland has grown to be one of the biggest intercity centers of bus operation in the country. About one hundred and twenty-five buses now have their terminal in the Public Square. Within the next two or three months, however, this will be closed to all buses, and also to some of the street cars, on account of the construction of a new union depot, where all the steam railroads will be centered. Consequently it has become necessary for the various lines to find other terminals.

By reference to the map it will be noted that the Union Motor Stage Terminal is only a short distance away from the Public Square, less than ten minutes' walk in fact, and it is but two blocks away from Euclid Avenue, the main business street of the city. The terminal property lies in the heart of a department store, theater and hotel

district. One of the largest hotels of the city, the Winton, is right next door, a covered passageway leading directly from the hotel into the terminal property. The central location is indicated on the map accompanying this article, as is also the route followed within the city by the various lines. Further details about these lines are given in the accompanying table.

The terminal really consists of two buildings. These have been laid out so that the larger one, the garage, is on a side street, Bolivar Road, where property presumably is less expensive, while the waiting room with its passenger accommodations is on East Ninth Street. This happens to be one of the main arteries crossing Euclid Avenue and, in fact, is one of the main thoroughfares cutting the city north and south. The two buildings are so placed, however, that buses pass through the garage, make a turn at right angles and are then headed

toward the street when they stop at the passenger loading platform. Passengers may be carried through the garage without inconvenience, because with its 20-ft. ceiling it is practically as airy and spacious as if they were outside between closely built up city streets. Both buildings are one story, of fireproof brick construction, the waiting room having a 34-ft. frontage and extending a depth of 55 ft. 6 in. from the curb, while the garage extends 72 ft. 6 in. along Bolivar Road and 181 ft. 7 in. to the rear. The latter, however, is wider at the back, as shown in the plan, because of an extension.

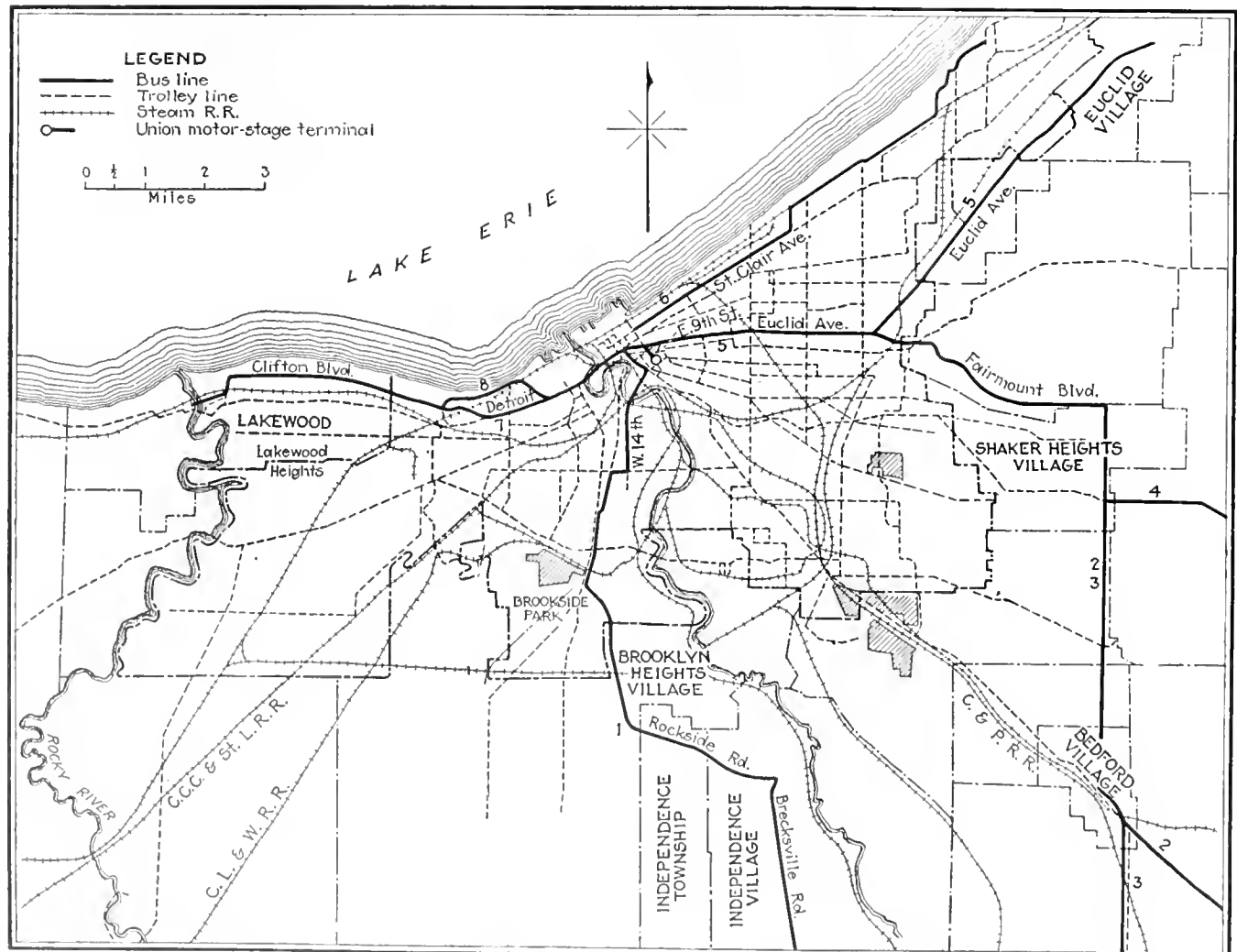
Administrative offices of the associated companies are now located on a second floor, over the front of the garage. This second floor is only about 20 ft. deep, being built up over the store and drivers' room, shown in the plan. The remainder of the garage is of one-story construction. Later it is planned to move the offices into the waiting room building, which will have two more stories added.

Passenger accommodations in the waiting room include the usual settees, comfort facilities and ticket office. In addition there are concessions where newspapers, candy, ice cream and fruits may be bought, also a shoe-shining stand. It is expected that these will bring in an income of about \$5,000 per year. As mentioned before, the buses come through the garage and then into a private alley past the waiting room. The covered platform has space where three buses may be loaded at once. Sliding doors in the waiting room face each of these spaces, and the platform is of the right height so that passengers may step directly into the buses. Another feature of the waiting room, brought out in one of the illustrations, is the use made of the front windows. Maps of the important routes are laid out in heavy lines with red paint, all the important towns being indicated in white letters.

When laying out the garage building, the architects, the Miller & James Company, Cleveland, endeav-

ored to include the most modern equipment and conveniences, as well as to utilize the most up-to-date features of building construction. The floor area, which is about 14,000 sq.ft., exclusive of the stores and offices, is entirely clear of posts or columns. Because of this wide span, more than 72 ft. in the clear from wall to wall, it was necessary to make the steel trusses extremely light. This was accomplished by using corrugated steel roofing covered with asbestos, a construction which is said to form the lightest known type of fireproof roof designed to carry snow and other loads required by city ordinances. The floor in the main garage is of concrete, extra heavy, reinforced with wire mesh, and topped with a patented hardened surface to prevent wear and dusting.

Ample door accommodations are provided. The three main doors (two at the front and one at the rear leading to the waiting room) are each 20 ft. high and 12 ft. wide. They are of the lift type, each controlled by an electric motor.



City of Cleveland and surroundings. The lines starting from the Union Motor Stage Terminal "fan" out to follow the main highways. Route numbers refer to table on page 304.



Front of garage on Bolivar Road. Note the large entrances at each corner of the building



Looking at the washing stand. One of the indirect heating units at the right with a connection to ceiling

They roll on tracks made from railroad rails and imbedded in the concrete floor. There are also sliding doors leading from the main part of the garage into the repair shop and paint shop.

#### INDIRECT HEATING SYSTEM USED

To provide proper heating and ventilation for such a large building, where exhaust gases and gasoline fumes are present, an indirect system of heating has been installed. There are three 11g heaters of the unit type, each containing a fan and three Vento radiator coils. One of these is placed at the extreme rear, another at the middle of the building on the left hand side and the third at the front near the washstand. The ventilators alone can be used in the summer, when it has been found that the air taken through the large doors is sufficient to eliminate ob-

noxious gases. In winter the heater units draw fresh air from the outside, pass it over the ventilating coils and discharge it into the garage, at the same time recirculating a certain part of the garage air. Heavier gases are drawn upward and through ventilators in the ceiling by means of a large fan in a plenum chamber above the ceiling, when they are discharged to the outside.

What is said to be one of the largest wash racks for motor vehicles in the country is shown in the plan view of the garage. This consists of pits over which the buses to be washed are run; it has space for washing two buses at once. It is equipped with nozzle sprays, mixing valve for hot and cold water, air line for kerosene spray used in removing grease and a large motor driven fan for drying. A battery of twenty-four lights is arranged so

as to illuminate the top, sides and bottom of the bus while it is being cleaned. Air for the kerosene spray is supplied from a 1-hp. Utica air compressor, which also is connected with plugs for tire inflation.

Inside the repair shop is a large pit of the suspended type, there being a basement underneath the pit. This has facilities for drainage and also for ventilation. In addition a portable fan can be arranged to blow air down into the pit if desired. In the same room are a 16-in. x 8-ft. South Bend lathe, a drill press of the Cincinnati Bickford make and a bench where batteries may be charged, formed and built. This includes a Tungar rectifier. At the back of the repair room is a balcony containing steel shelving, where some \$7,500 worth of parts and supplies are stored. A traveling crane is provided to handle the heavy work.



Inside the Cleveland-Akron Bus Company garage. White and Fagor buses with sedan and street-car type bodies, backed against wall



The Cleveland-Akron Bus Co.

Bus No. \_\_\_\_\_ Mileage \_\_\_\_\_ Date \_\_\_\_\_

Driver \_\_\_\_\_

Inspector \_\_\_\_\_

TWO CHANGES

\_\_\_\_\_

\_\_\_\_\_

Garage Report

Repairman's Name \_\_\_\_\_

New Parts Used \_\_\_\_\_

Time Started \_\_\_\_\_ Time Finished \_\_\_\_\_

Total Hours \_\_\_\_\_

Checked By \_\_\_\_\_

Signature \_\_\_\_\_

*This daily advertisement stimulates business in Wichita, Kan.*

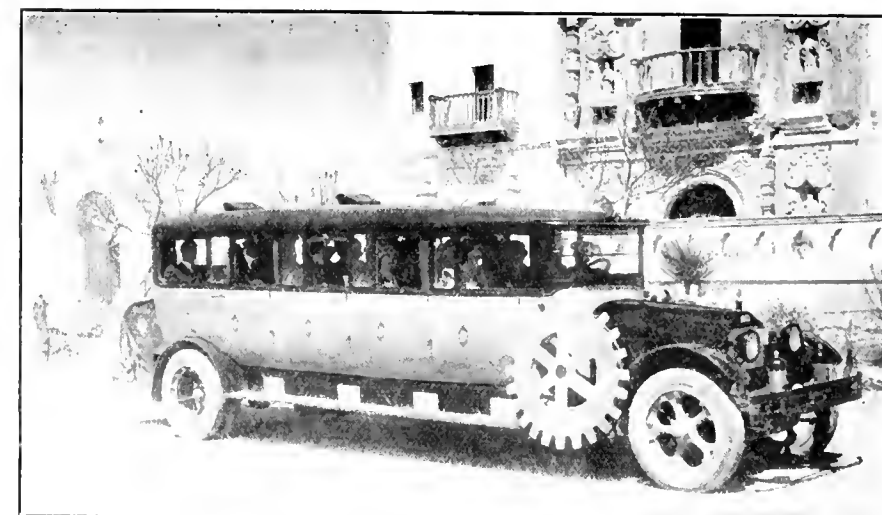


## Long-Distance Tours Prove Profitable

**Arizona Line Serves Twenty-eight Towns. Also Handles Railroad and Local Tourist Business**

THE Union Auto Transportation Company, with headquarters at Phoenix, Ariz., has built up a good business during the last few years. Starting from a small organization operating five cars and serving three towns, it now has forty cars and buses, serving twenty-eight towns, most of which are to the west of Phoenix, where the terminus is the Globe-Miami mining district. White chassis are used on all lines. On the Apache Trail, where many tourists from the Southern Pacific Railroad are carried, Yellowstone-type stages with the top lowered are used, so as to give travelers a clear view of the famous scenic highway. The Apache Trail, which for years was in terrible condition, has been put into fine shape recently, the Arizona Highway Department having spent about \$500,000 in repairs.

On other lines the company has White Model 50 bus chassis fitted with sedan type bodies seating eighteen people. These have a special



*Union stage with Prescott (Ariz.) Rotarians on five-day trip to Mexican border. In background is San Xavier Mission near Tucson, built by priests in 1690*

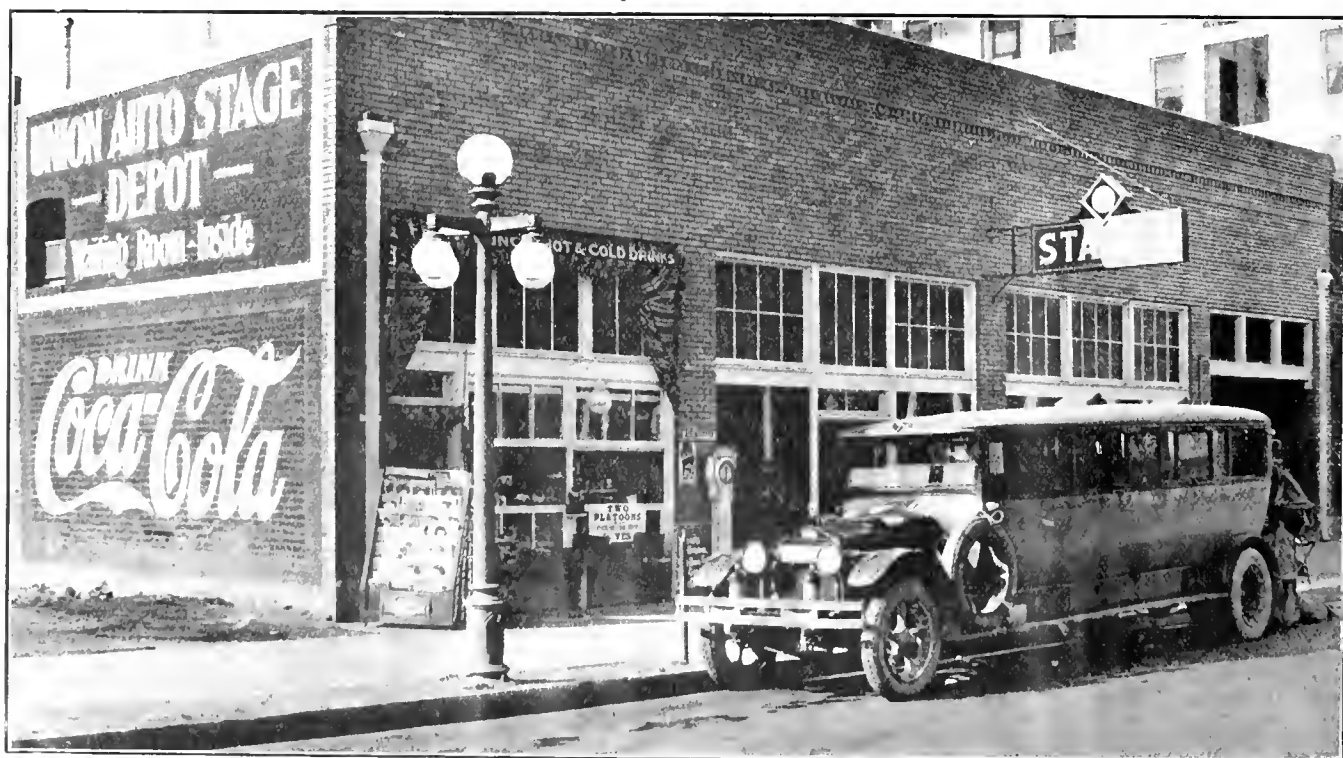
compartment for ladies, a smoking compartment, heaters, ventilators, and a baggage carrier at the rear. One of the large buses is shown in front of the company's depot at Phoenix, where a waiting room, restaurant and soft drink parlor are maintained.

Large Whites are also used for long distance charter, as indicated by the view taken in Tucson, which is some 200 miles south of Phoenix. The party shown here started from

Prescott, in the central part of the state, and made a five-day trip by way of Phoenix and Tucson to Nogales, on the Mexican border, which is a popular place for conventions.

The rates charged for regular passenger service average about 4 cents a mile, although on some routes they are as low as 3 cents. While the company is incorporated, all the stock is held by active members. P. E. Beutke is president and B. H. McAhren is secretary and manager. In addition to the depot, the company owns and operates a maintenance shop under the management of Judson King.

*Union auto stage terminal at Phoenix, the capital city of Arizona*





# Hauling Workers at Ford Headquarters

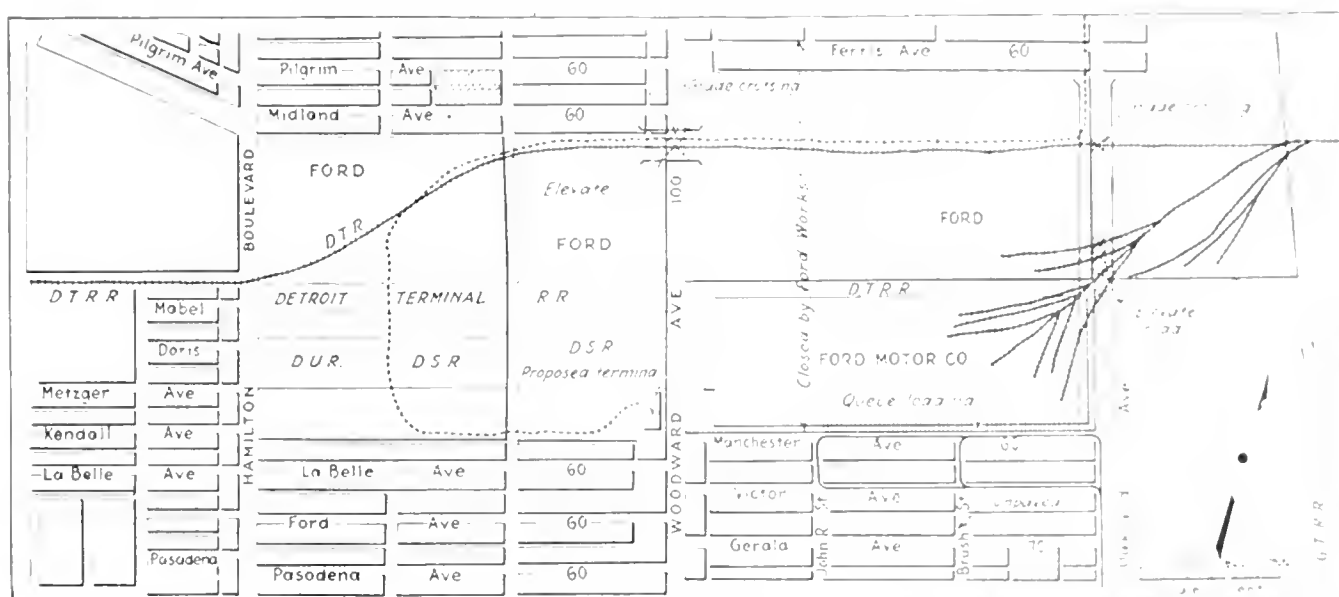
At Highland Park Thousands of Passengers Present Difficult Traffic Problem—Comparison of Motor and Street Car Flexibility and Capacity—Joint Terminal Recommended for All Transportation Facilities

**T**O MANY bus operators traffic congestion is not a theory—it is a troublesome fact. It grows harder and harder to get suitable terminal facilities, especially in the downtown sections where people want to be landed. A study made recently of one of the worst traffic situations in the country should be helpful to all who are affected by proposed traffic regulations, and who should, therefore, take part in over-

ing south to Detroit, 6½ miles away, and north to Pontiac and residential sections in between. Fortunately, this load is not discharged from the plant at the same time. Some 10,000 men leave at 7:30 a.m., and the peak is reached at 3:30 in the afternoon, when 30,000 men finish their work. A third shift of 21,000 gets through at 11:45 p.m.

To handle this great outpouring there are three facilities, all operated

trolleys, two seconds for vehicles, or 0.2 second for pedestrians. These headways represent a movement each hour of about 200 trolleys, 1,800 motor vehicles and some 20,000 pedestrians. In addition to all this traffic, there is a two-minute suburban bus service to Pontiac and points north and a thirty-second de luxe jitney service into Detroit. Both buses and jitneys pass through the congestion at the Manchester Avenue cor-



Portion of Highland Park, where bus, jitney and trolley serve Ford employees

(Dotted line shows proposed interurban connection to the north. Railway tracks on Woodward Avenue not on drawing)

coming the difficulty. The following is taken from a report prepared by J. Rowland Bibbins, consulting engineer, Washington, D. C., for the City Council of Highland Park, Mich.

The main plant of the Ford Motor Company lies along Woodward Avenue in Highland Park. Not in Detroit, however, because Highland Park is politically a separate municipality, although surrounded entirely by the automobile city. But Highland Park, with its 47,000 people, according to the census, contains the Ford plant with 70,000 employees. About two-thirds of these use the traffic facilities on Woodward Avenue, which is the main highway lead-

directly on the highways. First, in point of numbers carried, is the trolley system of the Detroit Municipal Railway, which runs trains of two cars each on a sixty-second headway along Woodward Avenue into the city of Detroit. Passengers board the trolleys, at the rate of one a second, either on the street or on loops in the car yards across Woodward Avenue from the Ford buildings. Manchester Avenue runs along the southern edge of the Ford site and makes a T-junction at Woodward; here is the neck of the bottle as regards traffic movement.

At this T-street crossing traffic passes during rush hours at a headway of better than thirty seconds for

ner, before turning, and thus double the total movement.

The de luxe jitney service is supplied by individually owned touring cars, the owners of which are now in litigation to retain their licenses. Operating on Woodward Avenue, these give Highland Park a through service to Detroit. And this is the only rapid transit service available today between these important centers. While the jitneys accelerate and brake faster than the street cars, their maximum speed is but little if any higher than that of the street car operating under full voltage; that is, between 20 and 25 m.p.h. But because of their ease of movement in and out of traffic and small

number of stops, the jitneys make the trip nearly twice as fast as the trolleys.

Of course they are entirely dependent upon good pavement and a share of the roadway; with the large jitneys this amounts to nearly one-half of the length of the average street car. Moreover, the fare is from two to three times the street railway fare.

#### RESULTS OF TRAFFIC COUNT

According to reports, with 125 jitneys in service in June, there were 143 driveaways between 3 and 4:30 p.m. from the Highland Park terminus. On a Saturday count, with unusually congested traffic, the Woodward Avenue jitneys handled 18,754 passengers between 5:30 and 12 midnight, while the four jitney routes operated in Detroit handled 52,000 passengers during the day.

The results of a further analysis of motor bus and jitney operation made on July 3 and 9 are shown in the accompanying table. All northbound buses and practically all southbound jitneys operated under load. The bus headway averaged about five minutes during the afternoon with a maximum movement of two and one-half-minute headway for the heaviest fifteen-minute periods.

On the first count, July 3 (showers), jitney movement averaged sixty seconds headway and thirty seconds for maximum fifteen-minute interval. This is about the same headway as rush-hour street car or train movement southbound in Woodward Avenue.

On July 9 (fair weather), jitneys averaged fifty-four seconds headway and thirty-five seconds for the thirty minutes (3:35 to 4:05 p.m.) of maximum operation. On this count the jitney movement actually increased to twenty-seven seconds headway (rate of 134 jitneys per hour) during one five-minute period. The base service offered by the jitneys was quite regular on July 3, averaging sixty seconds headway, exclusive of the "rush extras"; it was less regular on July 9 (rainy).

A point of importance is that the number of jitneys in line at the loading stations during average five-minute periods was less than two, and that the average time in line was less than one minute, which must necessarily be so in order to hold to a headway of sixty seconds or less.

These results show conclusively that the jitney headway throughout

the afternoon is nearly equal to the maximum rush headway of street cars, and is much closer than the street cars during the heavy output of the Ford works. The jitneys carry only seven pay passengers, as against ten times seven or more for a street car, and twenty times that or more for a two-car train. But they require less than half of a street-car length in the street and can maneuver through the traffic.

Passenger turnover on the jitneys is sufficient to record about ten passengers per trip except during the light (non-rush) hours. If a one-minute headway in Woodward Avenue were maintained throughout the day of eighteen hours this would make the total carrying capacity in excess of 10,000 passengers per working day, and with rush extras probably 12,000 passengers or more.

This traffic, 12,000 passengers, is practically the line capacity per hour of a double-track single-car trolley line operating with a thirty-second headway, which is near to if not the practicable limit. It is thus clear that street cars, maintaining about the same headway as these jitneys, have the capacity to handle from eighteen to thirty-six times as many passengers, according as single or trailer units are used.

#### WHY JITNEYS EXIST

As before stated, the jitneys make very much faster scheduled speed, and this is their principal reason for existence. On an average one way Detroit to Highland Park trip they make from five to seven stops, or about one per mile exclusive of traffic stops. Street cars are required to make from five to ten stops per mile, owing to the constant interchange of passengers. The possible schedule speed of any given transport equipment, with a given rate of acceleration and braking and maximum running speed, is about inversely proportional to the number of stops per mile and the average duration of stops. Assuming an average thirty-second stop, 1,000 ft. apart, or 5.3 stops per mile, then about seventeen minutes of the run from Detroit to Highland Park is consumed in stops. At 8½ m.p.h. schedule speed the 6½-mile run should take about forty-five minutes. This means that more than one-third of the street car schedule time is consumed in stops. In terms of actual running time the stops represent considerably more than one-half.

In this question of stops lies the whole merit of the motor bus service, for at one stop per mile of thirty seconds each only 3.3 minutes are required for stops out of a run of perhaps fifteen minutes.

It is a question whether this same rapid de luxe service could be rendered by large buses even if run at the same headway. Buses, with from twenty to forty seats, would have to stop much more frequently to accommodate the larger number of interchanging passengers, as is the case with street cars, which already have limited stops. And as the rate of acceleration, braking and running would probably be less than the jitneys, the use of the larger bus units would probably defeat in considerable measure the purposes of the service—rapid transit—in comparison with the present small capacity units. The only remedy for this condition would be to reduce the number of stops, which again would subtract considerably from the facility of the present unlimited-stop jitney service.

The preceding should not be construed as an argument for or against jitneys and buses, but rather to encourage economic study of the relations between street car, bus and jitney service with respect to street capacity and the universal desire for and need of rapid transit. It is a question whether such a facility as now exists ought to be driven off the street without providing a reasonable alternative—a matter outside of the present study.

In the end, the ultimate cost of operation will determine whether the jitneys will continue. Meanwhile, if the people of Highland Park actually depend upon the rapid service and are willing to pay the de luxe fare reasonable arrangement should be made for routing and loading these vehicles under proper police regulations as to permissible time and plan of loading. Individual violations of police regulations should be placed upon the violator and not upon the entire facility.

The present loading stations for both bus and jitney are not well located, particularly those of southbound traffic, because they interfere with each other and the street car loading.

#### AND NOW FOR THE BUS

It is impossible to predict how fast or to what extent the motor bus will strive to be able to transplant

## Traffic Counts—Motor Transportation on Woodward Avenue North and South

Bus and jitney movement July 3, 1923 (all hours)					
		Jitneys		Buses	
		South	North	South	North
Gerald Avenue					
Total (1 to 4:30 p.m.)		17	10	44	48
Average per hour		4.8	3.1	12.5	10.8
Maximum fifteen minutes		3	4	7	5
So. City Limits					
Total (1 to 6 p.m.)		302		8	
Average per hour		60.4		11.6	
Maximum fifteen minutes		30		7	
So. City Limits					
Total (1 to 4:30 p.m.)		176	100		
Average per hour		50.0	28.8		
Maximum fifteen minutes		27	11		

Note: Base jitney service less regular than on July 9. Average highway, one minute to the next.

Jitney movement July 9 (all hours)

Number leaving loading station (1:05 to 5:05 p.m.)	267
Average per hour	67
Maximum thirty minutes (3:45 to 4:05)	51
Rate per hour	102
Average highway, thirty-five seconds	
Maximum highway, twenty-seven seconds	
Number in line (average five minutes less than 2)	
Average time in line (less than 1 minute)	

Note: Base service fairly regular. Average highway, one minute.

street and interurban car service into the north country, east and west. The interurban railway development has an important bearing on this. As to whether the development will be entirely with heavy electric car equipment for long hauls and buses for short hauls, both sharing local terminal facilities, is a question. Proper foresight should be exercised, however, in giving the interurban lines a reasonable share in any proposed terminal. Obviously much depends upon two factors—condition and continuity of hard pavements, and roadway congestion.

It is only by experience that sufficient operating data can be secured to determine definitely the proper rate of fare at which the bus lines will be profitable, or, in other words, whether they can exist alongside of the trolley and interurban service now rendered by the established lines. Therefore, it is a grave question whether any policy should be entered into now by which this important economic experiment in transportation would be cut off until the full facts are at least developed. So long as they are permitted to operate, adequate facilities should be given them more suited to their needs than at present.

## TERMINAL PROPERTY RECOMMENDED

As a result of this study it is evident that street and track capacity should be brought more into consonance with the necessary existing traffic, to make up for developments deferred since pre-war days. The responsibility for these developments lies partly with the street railways, partly with the industries and partly with the cities of Highland Park and Detroit. Detour streets and prepayment loading stations stand out as

the most important needs. The opportunity exists for the development of a valuable and unique concessions-terminal property which will be self-supporting commercially and bring to one point, off the main highway, all facilities of transit—interurban, motor bus and eventually rapid transit, both local and through and interurban. For the present terminal property is located right for a man-transfer from surface to elevated or subway rapid transit, with

the sub-way well right in position for the mezzanine concourse of the future rapid transit station, which has been predicted at this point by all students of the rapid transit problem.

But, obviously, no such combined solution as above suggested can be brought about without harmonious co-operation between the several public and business agencies interested in the development of the city and, not to say the least, the railroad.

It has been thought in this suggested solution to avoid the usual plan of immediate drastic regulation as indulged in by the city authorities of excluding from the public streets either the vehicles or the car line or installing rigid semaphore traffic control throughout the day and night, which always introduces important elements of delay in traffic movements, particularly at off-rush hours due to the long signal intervals employed. On the contrary, a combined solution has been suggested which recognizes existing needs and spreads the burden of development more in proportion to relative responsibility and benefits to be derived.

Advertising Makes Waiting Room  
Self-Supporting

THE bus men of Middletown, N. Y., have solved the problem of the maintenance of a central station and waiting room. For some time they have maintained a waiting room, but the question of the expense attached caused differences of opinion as to the apportionment among the various lines using the room, due to the difference in the numbers of passengers carried. This resulted for a short time in the discontinuance of the central station. The matter was later taken up by the bus men with the merchants' committee of the Chamber of Commerce. A new location was found directly off the center of the city where a main waiting room 21 ft. x 40 ft. and a ladies' rest and comfort room 10 ft. x 15 ft. could be maintained. John Wilkins was engaged as manager, and with the co-operation of the merchants' committee and the bus men he evolved a plan of making the waiting room self-sustaining. This he has done by dividing the wall space into standard advertising spaces of 10½ in. x 24 in. These

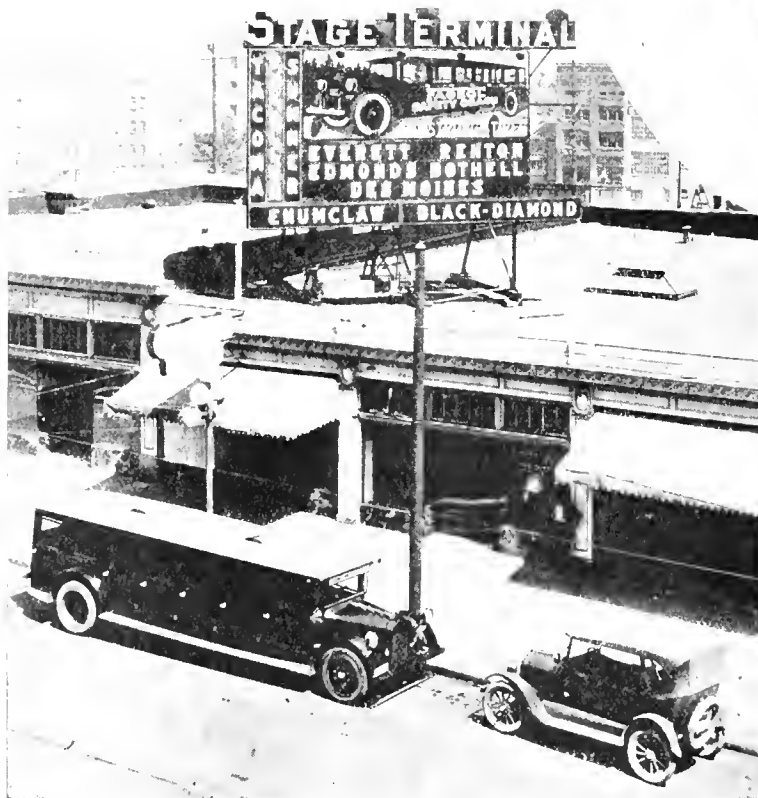
spaces are paneled off and sold to the merchants of Middletown and the surrounding territory on the basis of \$1 per space per month for advertising purposes. The total expense, including rent, salary, light and heat of the waiting room, is about \$2,200 per year, and the present income derived from the sale of space for advertising is the same amount.

The station is used by the Hudson Transit Company, the Newburgh Bus Line, the Monticello and Liberty Line, the Middlesex and Pine Bush Line, and the Middlesex-Sussex Line. On week days from 500 to 700 passengers pass through the waiting room, and on Saturdays from 700 to 1,000. The merchants using the advertising space report direct returns. In addition to the income the advertising cards, all of which are neat in appearance and some artistically finished, serve to make the room attractive for the waiting passengers.

This is a plan which can be worked out in many of the bus stations throughout the country with very little effort.

# Three Continents Pictured Here

*Europe  
Asia  
and  
North America*

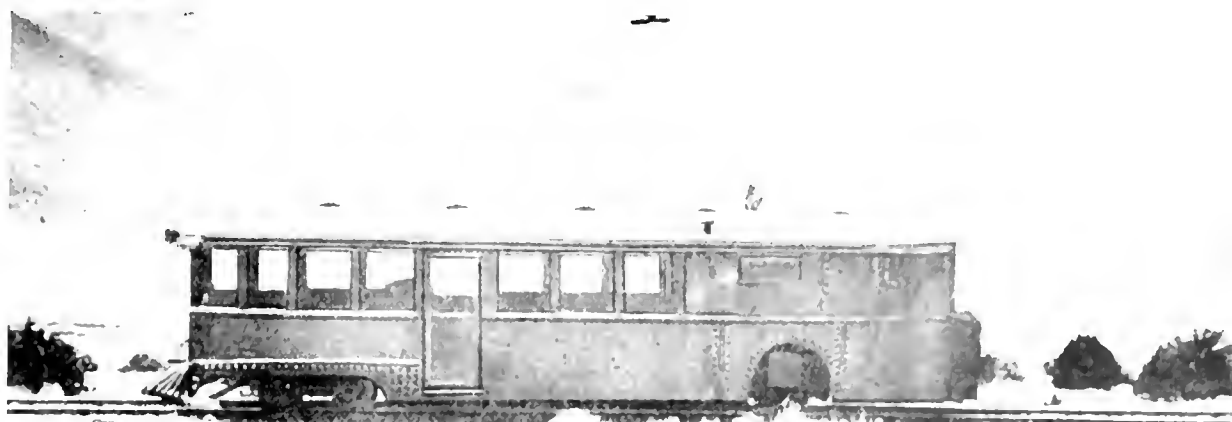


Snow sledding in French Alps. The sled has wheels on front and Kegresse-Citroen treads on rear. (Above in the circle.)

At the left is shown an electric sign which helps sell transportation at Seattle (Wash.) bus depot. Names of ten lines appear at sides and bottom.

In lower view F. W. D.'s used for local transportation in Canton, China. Fifteen of these buses are operated by Kwong-tung Tramway Company. Plenty of room here for advertising on tractor and trailer. Bodies built locally.



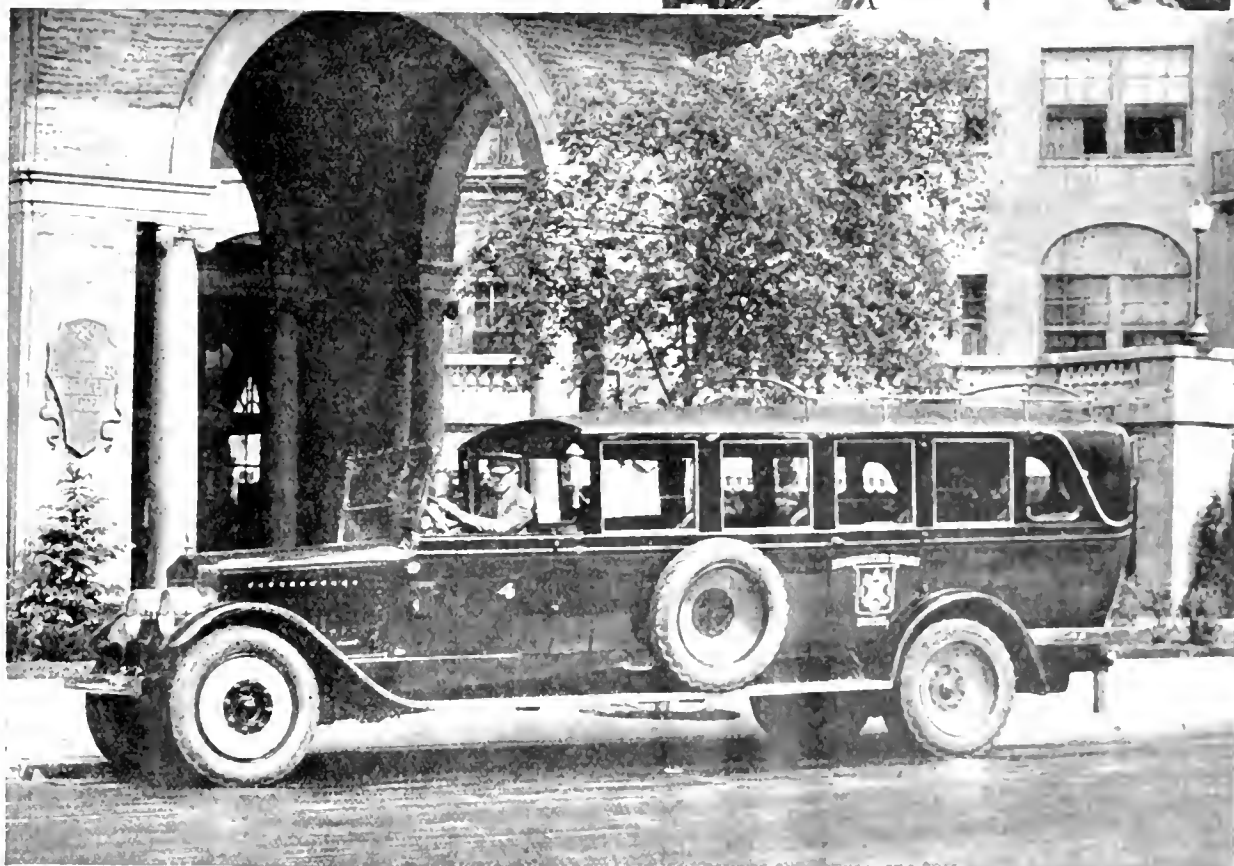


*Above*—Out on the Nevada, California & Oregon Railroad they use this gasoline "rail" bus. Track gage is 36 in. and car is 32 ft. long. Weight is 16,000 lb. Motor placed back of rear axle on sub-frame that swivels around rear axle.

*At right*—Inside an English single decker. Notice seat backs on this Leyland twenty-passenger bus.



*Below*—This de luxe bus (White Model 50 chassis and Bender twenty-one-passenger body) travels between downtown Chicago and the exclusive Edgewater Beach Hotel, 7 miles out. Guests pay 35 cents for the ride, others pay 50 cents.



## Good Profits, Good Friends—Results of Express Business at Portland, Ore.

MOTOR stages leaving the union stage depot at Portland, Ore., now frequently take express packages on which the charges total \$7 to \$8. Not only is this a business which is profitable, because it is handled with very little additional expense, but it makes many friends for the stage companies. Patrons recognize it as a real service because deliveries are made so much quicker by this means than when shipments are sent by way of the usual carriers. The total volume of express business going through the Portland terminal recently amounted to \$2,500 per month and is increasing rapidly.

Consignments are accepted ordinarily only for destinations where

in the accompanying illustration. With this is a carbon copy, bearing the same number, which is retained at the point of shipment. Many of the shipments are sent C.O.D., which is particularly desirable business because the carrier then collects a return charge on the money as well as the regular express rates. These C.O.D. shipments have attached to the waybill a heavy manila envelope, on the face of which a form is printed affording space for number of the waybill, date, shipper's name, and the itemized account consisting of (1) the amount of C.O.D., (2) the express charge, (3) the cost of returning the C.O.D., and (4) the total to be collected. When the C.O.D. collection is made the money is put in the envelope, which is then handled as a shipment to be returned to the consignor of the package.

No specific limitation has been placed on size and weight of express packages, but the dimensions of a small steamer trunk are about the maximum which it is convenient to handle. Obviously anything which cannot be put in the baggage compartment of the stage cannot be accepted. The express and C.O.D. charges are given in the table.

Uniform Package Rates on Portland Motor Stages

Pounds	Distances in Miles		
	1 to 25	26 to 55	56 to 125
1 to 5	\$0 25	\$0 25	\$0 25
6 to 10	.25	.30	.35
11 to 20	.30	.40	.50
21 to 30	.35	.50	.60
31 to 40	.40	.60	.85
41 to 50	.45	.70	.95
51 to 60	.50	.80	1 10
61 to 70	.55	.90	1 25
71 to 80	.60	1 00	1 45
81 to 90	.65	1 10	1 55
91 to 100	.70	1 20	2 00

C. O. D. Return Charges

Amount	Distances in Miles		
	1 to 25	26 to 55	56 to 125
\$1 to \$10	.25	.30	.35
10 to 20	.30	.35	.40
20 to 30	.35	.40	.45
30 to 40	.40	.45	.50
40 to 50	.45	.50	.55
50 to 60	.50	.55	.60
60 to 70	.55	.60	.65
70 to 80	.60	.65	.70
80 to 90	.65	.70	.75
90 to 100	.70	.75	.80

there are stations so the consignees can be required to sign for delivery. However, deliveries at specially designated points are frequently arranged by phone, and it is not unusual to deliver automobile parts to a car stranded on the road traversed by the stage route. In such cases the motorist in trouble telephones to the Portland dealer. The desired part can often be put on a stage within an hour from the time the call is received. Automobile dealers have been quick to realize the advantage of this delivery by a carrier that is giving frequent service and they make extensive use of it.

The form of waybill used is shown

### OREGON AUTO STAGE TERMINAL CO.

NO. \_\_\_\_\_

DATE \_\_\_\_\_ 192\_\_

C. O. D. . . . \$ \_\_\_\_\_

TRANS. CHARGE . \$ \_\_\_\_\_

RETURN OF MONEY \$ \_\_\_\_\_

TOTAL COLLECT . \$ \_\_\_\_\_

SHIPPED BY \_\_\_\_\_

TO \_\_\_\_\_

REMARKS \_\_\_\_\_

DATE \_\_\_\_\_ 192\_\_

RECEIVED PAYMENT \_\_\_\_\_

Envelope used for shipping C.O.D. payments, made of manila—3½ x 6 in.

When the consignee cannot be found at the address given the package is returned to the point of origin, and the shipper may there claim it upon payment of the express charges both ways.

<b>OREGON AUTO STAGE TERMINAL CO. PACKAGE WAYBILL No E 1999</b> PORTLAND, ORE. 192__		<b>RECEIPT FOR PACKAGE</b> DATE 192__ No E 1999 REC'D FROM _____ SUBJECT TO TARIFF IN EFFECT VALUE _____ WEIGHT _____ CHGS \$ _____ C.O.D. \$ _____ TOTAL \$ _____ OREGON AUTO STAGE TERMINAL CO. FOR THE COMPANY	
<b>CAMAS STAGE LINE CO. Inc.</b> ARTICLE _____ VALUE \$ _____ WEIGHT _____ SHIPPED BY _____ SHIPPED TO _____ ADDRESS _____ RECEIVED BY _____ DRIVER _____		<b>RECEIPT FOR CHARGES</b> DATE 192__ No E 1999 REC'D FROM _____ CHGS \$ _____ C.O.D. \$ _____ TOTAL \$ _____ CAMAS STAGE CO. Inc. DRIVER OR AGENT _____	
CHARGES ADVANCES C.O.D. C.O.D. RETURN TOTAL		AGENT WILL WRITE HERE WHETHER PREPAID OR COLLECT	
RECEIVED IN GOOD CONDITION _____ CONSIGNOR _____ <small>RATES ARE BASED ON A VOLUME OF \$25.00. FIVE CENTS WILL BE CHARGED FOR EACH ADDITIONAL \$25.00 OR FRACTION THEREOF.</small>			

<b>OREGON AUTO STAGE TERMINAL CO. C. O. D. WAYBILL NO. 3449</b> STAGE LINE PORTLAND ORE 192__		<b>RECEIPT FOR C. O. D. PACKAGE</b> DATE 192__ NO 3449 REC'D FROM _____ TO _____ SUBJECT TO TARIFF IN EFFECT VALUE \$ _____ WEIGHT _____ CHGS \$ _____ C.O.D. \$ _____ TOTAL \$ _____ OREGON AUTO STAGE TERMINAL CO. BY _____ <b>RECEIPT FOR C. O. D. CHARGES</b> DATE 192__ NO 3449 REC'D FROM _____ CHGS \$ _____ C.O.D. \$ _____ TOTAL \$ _____ STAGE LINE DRIVER OR AGENT _____	
ARTICLE _____ VALUE \$ _____ WEIGHT _____ SHIPPED BY _____ SHIPPED TO <b>C. O. D.</b> ADDRESS _____ REC'D BY _____ DRIVER _____ RECEIVED IN GOOD CONDITION _____ CONSIGNOR _____ <small>RATES ARE BASED ON A VOLUME OF \$25.00. FIVE CENTS WILL BE CHARGED FOR EACH ADDITIONAL \$25.00 OR FRACTION THEREOF.</small>		CHARGES ADVANCES C.O.D. C.O.D. RETURN TOTAL	

Package and C.O.D. waybills used on Oregon Stages. Size 4 x 8½ in. and printed in book with yellow sheet for carbon copy. At right are receipts given to shipper and consignee





*Buses above overhaul pits on second floor of garage. Elevator to the right in corner*

## Record Forms that Save Time for 100-Bus System

**A** FLEET of some 100 buses, of varied sizes and makes, requires a well-organized and efficient maintenance force, combined with adequate garage facilities. In the case of the Milwaukee Electric Railway & Light Company, the vehicles operated include double deckers and single deckers, the latter in both sedan and street car types. As was described recently in *BUS TRANSPORTATION* in the October, 1923, issue, page 479, service is given over some 600 miles of route, located in Milwaukee and all through the southern half of Wisconsin.

Maintenance activities of the company are centered at its south shop on Kinnickinnic Avenue. Here is a modern garage of two floors each about 75 x 200 ft. The lower floor is used for parking space, minor repairs and operating failures. Two pits are located at the extreme west end; an elevator takes the buses to the second floor for overhauling and inspection. In part of the old Kinnickinnic carhouses on the north side of the garage buses used for city service are parked, also snow plows and other miscellaneous equipment.

On the second floor are four pits, three at the west end and one along

### With Ideas Any Operator Can Easily Apply—In Addition, the Story of Inspection and Overhauls as Handled by a Successful Transportation Company

the north wall. Lathe, drill press, grinder and cleaning tank big enough to accommodate the largest unit have been installed. An overhead hoist is used to transport chassis units about the shop. Battery charging rack, electrical overhauling and body repair division are located on this floor. At this garage buses are inspected on a 2,000-mile basis, receive an intermediate overhaul on a 25,000-mile basis and a general overhaul on a 50,000-mile basis. Inspection consists of lubrication throughout the chassis and engine, wheels checked for slackness, battery and equipment tested.

Necessary repairs are made at this time on all parts which appear unable to operate until the intermediate overhaul. The organization which devotes itself to inspection consists of an engine man, front axle and steering gear man, rear axle and brakes man, clutch and transmission

and propeller shaft man, a carpenter, electrician and a tire man. Each one of this organization has his work clearly mapped out for him on a special inspection form sheet.

Tire pressure is checked, as is also the tire tag number. This tire number is a four-figured number burned into each side of the tire and has aided greatly in the check-up of tires, giving the company something to work on in obtaining adjustments.

Intermediate overhaul, as the designation implies, is an overhaul of all working parts without removing the units from the chassis. The body is not removed at this time, although it may receive a coat of paint inside and out or a coat of varnish on the outside. More attention is given to the units at this time than at the inspection period. A rigid test is given all parts without dissembling; however, should a part show excessive wear a unit may be changed. Extra units are kept on hand for all types of coaches, so that no delay will be necessary at this time. The head is removed from the engine, carbon scraped out, valves ground, bearings inspected and tightened if necessary. Rear wheels are removed, brake lining inspected



*At left, front end of second floor; mechanical reconstruction takes place here. At right, garage office, where records are kept and orders issued for bus overhaul and inspection*

FORM 107M-L19 22-3000

THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

OVERHAUL SHEET FOR BUS NO. \_\_\_\_\_ TYPE \_\_\_\_\_

TOTAL BUS MILEAGE AT LAST OVERHAUL \_\_\_\_\_

TOTAL BUS MILEAGE AT THIS OVERHAUL \_\_\_\_\_

REPAIRED BY	INSPECTION	DATE	Spendometer Reading	M.P.G.	PINTS OIL	REPORTS (Road Delays in Red)	
	<b>ENGINE AND OIL EFFICIENCY</b> 1 Run engine, examine for knocks - see that there are no apparent oil leaks, that engine and sub frame hold down bolts are tight, that exhaust points do not blow, examine compression. 2 Drain engine oil from crank case, clean screen, examine bearings, fill with clean oil. 3 What is the oil pressure at high speed? 4 Examine valve tappet clearances. 5 Examine radiator fan law brackets, bolts, bearings, belt and hose connections. 6 Examine water pump for leaks. 7 Replace broken bunnet clips. 8 Examine starting handle for binding or rattling. 9 Oil Wholes see that compression release pedal and lever are working properly. <b>ELECTRICAL SYSTEM AND GASOLINE EFFICIENCY</b> 1 Clean carburetor and spark plugs, examine accelerator gear and throttle rods. 2 Examine gas tank for leaks or broken supports, clean gas filter, examine all gasoline connections. 3 Drain some gasoline from vacuum tank and examine all connections for air leak. 4 Clean carbon from exhaust ports. 5 Clean magnetos, on Loaches see that magnetos have proper advance, examine leads, clip, bolt and coupling. 6 Examine coils to battery, what is hydrometer reading of each cell? No. 1 No. 2 No. 3 No. 4 No. 5 No. 6 7 What is generator charge rate? 8 Are generator brushes and commutator in good shape? On Model 15 Where, examine generator chain is water working properly. 9 See that buzzer, buzzer buttons horn and horn buttons are working properly. 10 Examine all lights and switches. <b>CLUTCH, GEAR SET, STEERING MECHANISM, FRONT WHEELS AND FRONT AXLE</b> 1 Examine clutch operating gear, thrust race hangers clutch shaft bushing coupling coupling covers and coupling bolts. 2 See that clutch is properly adjusted and greased. 3 Oil Wholes drain oil from clutch housing and replace with clean oil. 4 See that gear set is in line, that bolts are tight and gears meshing properly. 5 Examine gear box oil level. 6 See that there is sufficient clearance in gait. 7 See that change of speeds slides freely through gate and that the bushings or reverse lever lock are not unduly worn. 8 See that steering wheel has no back lash, that steering column bracket is tight on chassis frame, that steering lever on steering gear is tight on square, that steering ball, springs and nuts are in good order, that steering connecting rod has no hit, that spindle arms are tight in tapered and that all important nuts are pointed. 9 See that wheel bearings nuts and washers are in good order and properly greased, that pivot pins in well and that threaded ends are not worn. 10 See that wheels are in line, and that wheel nuts or rim nuts are tight. 11 Examine front springs, spring brackets, shackles and shackle bolts. See that springs have sufficient arch. 12 Is speedometer working properly? <b>REAR AXLE AND BRAKES</b> 1 Examine rear springs, spring brackets, U-bolts, king bolts, shackles and shackle bolts. See that springs have sufficient arch. 2 Examine wheels see that pads in good order, that wheel nuts or rim nuts are tight, that there are no stones between tires, that tires are in good condition and properly twisted (on buses having dual tires). 3 Examine rear axle shafts for possible defects. Examine shaft bearing adjustment, test worm bearings, see that flange is tight on worm shaft and that carrier bolts are tight. 4 Examine oil in rear axle housing and replace - filling to proper level, see that there are no oil leaks. 5 Examine brake lining. When removing lining see that there is no undue wear in brake cam bushes. See that brake drum bolts are tight. When replacing wheels be sure that they are tight on taper. 6 Examine all brake connections and see that all bolts and nuts are secured with cotter pins. 7 On U-45 Wholes pack up rear wheels and remove hub caps and cotter pin in end of rear axle spindle and tighten the castellated nut. On other Wholes remove hub cap and examine this nut for tightness. 8 Remove cotter pins and tighten universal joint bolts. 9 Are universal joint discs or bushings in good condition? <b>BODY AND SIGNS</b> 1 Clean heat pipe screen. Examine heat pipe assembly covering where it comes through floor, see that there are no loose sections. 2 Examine muffler and heater valves. 3 See that fuel and oil hoses are thoroughly banded. 4 Examine body for any rubbing points likely to impair passengers or damage busbody. 5 Examine seats for loose or leaks. 6 Tighten straps for fasteners. 7 See that destination sign and signaling mechanism are in good working order. 8 Examine windows for rattles and all work. Glass in place - if required. 9 See that axles and clasp axels. 10 See that door operation works properly. 11 Examine fire escape and stairs so that all axels are firmly in place. 12 See that windshield wipers are in place and work properly. 13 See that tire air gauges are in place and in working order. 14 Are windshield hinges and clamps as used - if mounted secure at all points angle. 15 Tighten hoodstraps and doors and see that 1 examine license plates and holders. 16 Examine tire carriers. See that locks are C K.						<div style="text-align: center;"><b>TIRE TAG</b> T. M. E. R. &amp; L. CO. Serial No. _____ Style _____ Car No. _____ Wheel _____ Date _____ Odo Reading _____ TIRE REMOVED Change made by _____ DETACH THIS HALF WHEN TIRE IS REMOVED FROM STOCK Size _____ Make _____ Serial No. _____ Lot No. _____ From _____ Issued by _____ Issued to _____ For Car No. _____ Date Out _____ Test No. 2643 Style</div>

NOTE—FOR WEEK ENDING \_\_\_\_\_ TYPE \_\_\_\_\_ GASOLINE AND OIL AVERAGES ARE \_\_\_\_\_ AND \_\_\_\_\_ M P G. RESPECTIVELY. BUS \_\_\_\_\_ IS THEREFOR \_\_\_\_\_ THE AVERAGE ON GASOLINE AND \_\_\_\_\_ THE AVERAGE ON OIL.

GENERAL REMARKS:

Inspected by \_\_\_\_\_ Signed \_\_\_\_\_ Operation Foreman \_\_\_\_\_

Overhaul sheet follows bus through shop. Right-hand column filled in previous to overhaul, and left-hand columns during overhaul. Insert shows tire tag which accompanies each spare tire. Red is used to indicate old tire and white to indicate new tire

Date: 10-1-54  
 Station: 100  
 Month Ending: May  
 License: 100  
 Make: 100  
 Model: 100  
 Year: 100  
 Color: 100  
 Description: 100  
 Remarks: 100  
 Total: 100  
 Per Mile: 100  
 Per Hour: 100  
 Per Day: 100  
 Per Week: 100  
 Per Month: 100  
 Per Year: 100  
 Total: 100  
 Per Mile: 100  
 Per Hour: 100  
 Per Day: 100  
 Per Week: 100  
 Per Month: 100  
 Per Year: 100

[illegible]

clean the exterior and interior of all coaches each night. This feature of the work is taken care of on the ground floor of the two-story garage, while the inspection previously referred to is held over three pits in the rear on the ground floor. The intermediate overhaul is carried on over three pits at the rear of the second floor, while the front of the second floor is used for the general overhaul. It is in this portion of the building that the machinery is located for doing the necessary machine work on the engine. Fifteen men constitute the 7 to 4 overhaul shift, while thirty-five men are used

on the 7 to 4 inspection shift. Trouble shooters supplied with a repair wagon are constantly on hand to meet any emergency that may arise on the road. Washers are always on hand, their heaviest work coming between 11 p.m. and 7 a.m., at which time eight men are on duty.

Records are kept of the performance of each vehicle, particular attention being paid to the oil, gas and tire mileage. The company maintains its own filling station adjacent to the garage, and the man in charge supplies most of the data for the record sheets. A complete oil change is made at the inspection period and also at 500 miles after a general overhaul. At other times the oil level is maintained by adding fresh oil. Discarded oil from the crankcase is used to lubricate springs and street car door mechanisms. Trip sheets, bus condition reports, delay cards and tire tags filled out by the operator are used as a means

of obtaining statistical information relative to the operation and condition of each vehicle.

It has been found desirable to list the various possible failures on a vehicle on the "bus condition report" in order that the driver may check off the defects. The original of this report goes to the garage superintendent while the carbon copy attached goes to the superintendent of transportation. Delays caused by equipment failures are recorded on the large overhaul sheet representing each bus. Defects recorded on the bus condition report are also posted to the large overhaul sheet, entry being made in black ink, while entry of defects causing delays is in red.

The tire tag previously referred to accompanies each spare tire and is filled out when the spare is used to replace a defective tire. A record of these tire changes is kept in the garage office and it is from this that the tire mileage is calculated.

is made by the White Motor Company, Cleveland, Ohio, and the twenty-one-passenger body by the Bender Body Company of the same place.

At present Miller tires are used, 36x6, single in front and dual rear. In the near future the owner is going to put smaller tires on in the front and use larger single tires in the rear. The reason for this change is that this bus line runs through the oil district. The mixture of oil and mud there encountered sticks between the dual tires and forms a large mud pack. This combination makes too much wear on the engine and body and the riding is too bumpy for the passengers.

The bus line covers the following towns and cities: Wichita, El Dorado, Benton and Towanda, Kan., 76 miles for the round trip. Three round trips have been made each day, but the management will take off the bus leaving El Dorado at 6 p.m., because the hotels there are complaining that it takes too much business away to Wichita.

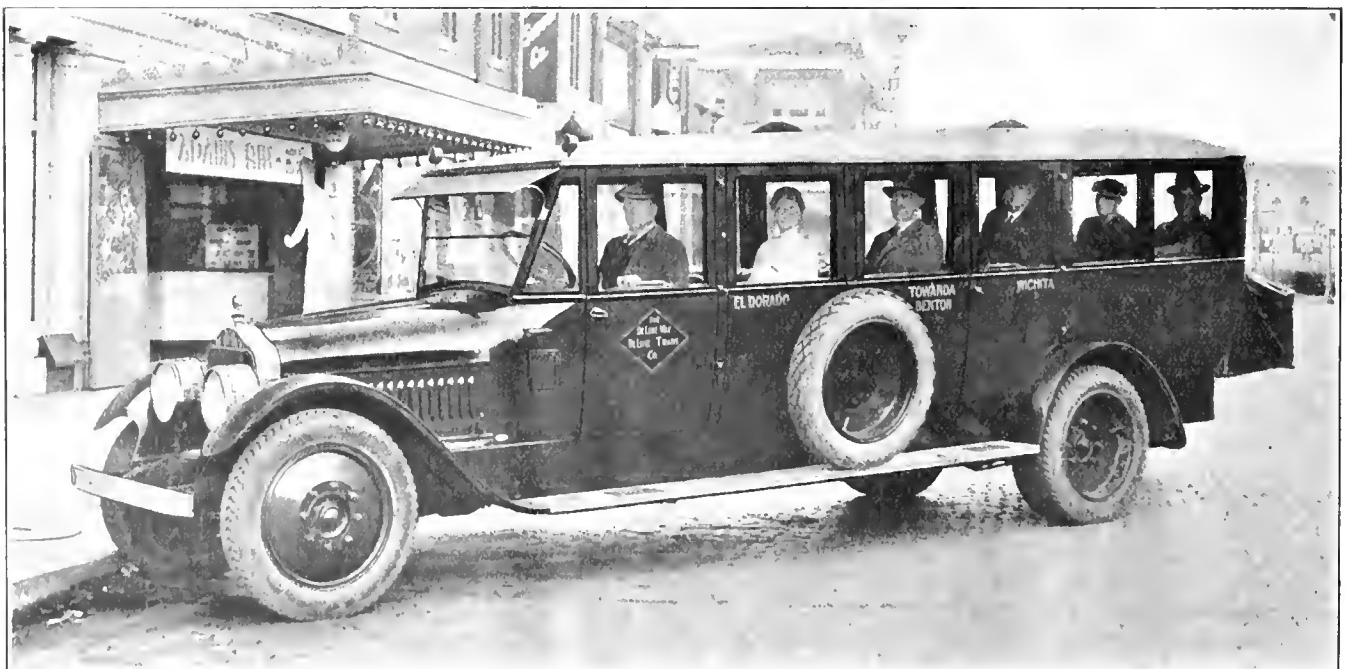
The fare for the round trip is \$3; one way, \$1.50. This rate is only 38 cents higher than the railroad fare over the Missouri Pacific and the running time is better by bus.

The De Luxe Bus Line is owned by John W. McClure, El Dorado, Kan. This operator places service above financial gain. Only recently he refused an offer of \$300 for three days use of his bus in Wichita, so as not to disrupt his schedule and disappoint his patrons.

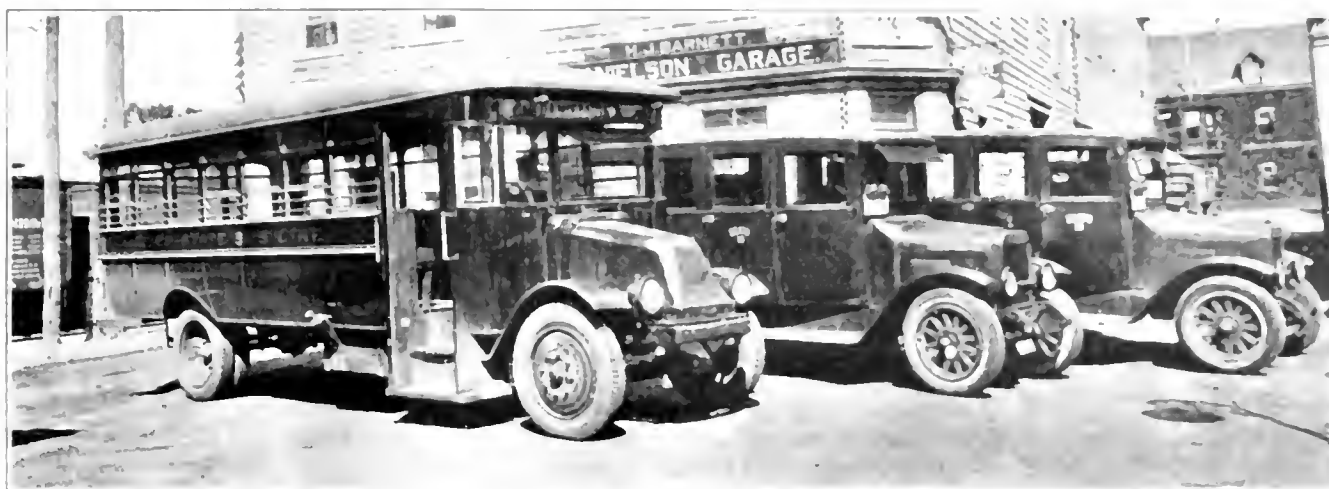
## Scheduled Trip Dropped to Hold Business at Home Hotels

**W**HEN the explorers in Egypt uncovered King Tut's outer chamber they found that the chariots used by the King were of the best materials and made in the ancients' most approved style. After 3,000 years these royal carriages were still good and not much affected by the

air of the twentieth century. If a modern King Tut wanted to make a trip from Wichita to El Dorado, Kan., he would undoubtedly select the new De Luxe Bus Line for his twentieth century trip. On this line is a new bus believed to be the finest one in all Kansas. The chassis



*On line between Wichita and El Dorado, Kan. The full-of-business driver is Lot Leonard of El Dorado*



*Bus meets bus at railroad depot near headquarters of line in Danielson.*

## School Business, an Owner Finds, Is a Worth While By-Product

**O**VER the hill to the schoolhouse. This is what the Willimantic-Danielson bus line does. It runs over the hill to the schoolhouse. But it does a lot more than that. It performs a real public service in a rather thinly settled hill district of central and northern Connecticut. It has been doing so for more than three years now. And in these three years, with their rigorous winters, not one trip has been lost because of any equipment fault or on account of snow. As for the service, it is more than attractive. Large and small buses, driven by fully liveried chauffeurs, are alternated with skill.

Residents of the territory served by the bus line who depended upon the steam railroad for transportation were, to use the vernacular, about ready to give up the ghost before the bus line was established. A railroad with only two local trains a day is hardly a railroad. It is a provocation. And this is what the railroad connecting Willimantic with Putnam had come to be to the residents of Hampton, Clark's Corner and North Windham, who desired to do business in Willimantic and were not independent of the railroad through ownership of private cars. Perhaps the growing use of the private auto forced the railroad to reduce its service. There is such a thing as real economic necessity. It is relentless in its workings. It was particularly relentless in this in-

### **Fifteen and Thirty-Passenger Vehicles Are Alternated to Advantage on Rural Line in Connecticut and Rhode Island—Big Bus Used for School and Holiday Service**

stance. In fact, working indirectly it threatened the civic life of some of these villages, by almost denying the coming generation a means of getting to school. At this juncture it stepped the bus.

A small volume might be written about the meaning of this bus line to the residents of the territory which the buses serve. This, however, is not an economic study. It is intended to be an account of the successful use of a large bus and of one of moderate size to give service between a town of about 13,000 people and one of about 5,000 not directly connected by railroad. The distance between the two towns is 20.5 miles. By connecting at Danielson with a bus line operated by the proprietors of the Willimantic-Danielson route the trip by bus can be made all the way to Providence. In fact, Danielson is the pivotal point, for here are located the headquarters of the bus lines. The entire route from Willimantic to Providence is 46.5 miles and the combined fare is \$2.50. The route from Danielson to Providence was not opened until June of this year.

The fares and distances are all

shown on the accompanying timetable. That document is inarticulate, but a study of it indicates the nicety with which the connecting times have been worked out and shows that the lay-over time has been so kept down that the buses are in almost constant use.

At its start the Willimantic-Danielson service was improvised to meet a sudden need. In other words, it was put in over night, so to speak. The original equipment consisted of two Reos and one Veie with a Day-Elder body. One of these vehicles was equipped with cross-seats for twenty-four passengers and was used on the early morning run so as to carry school children to Willimantic in time for the opening session of the High and Manual Training Schools there, and again on the 3.15 trip from Willimantic. In addition this vehicle came in handy for use on Saturdays and on Sundays when traffic is at times very heavy. Four trips in either direction are made every day, but the week-day traffic for two trips is not heavy. This light traffic was handled in the vehicles with longitudinal seats.

In its way the equipment thus provided answered the purpose and the public served was grateful and satisfied. The fact that most any kind of service would have satisfied them did not weigh with the proprietors of the line. They had ideas of their own about what a bus line should be and do. But they had to feel their





ours to make the lines self-sustaining. A glance at our schedules shows that we just about achieve this. On the Willimantic-Danielson route the fare per mile is close to 6 cents. School children are handled at slightly less than half the regular fare basis. This business is confined largely to that part of the Willimantic-Danielson run from Hampton to Willimantic. The children entitled to ride are certified to us at the beginning of the school year by the school authorities, and they are then supplied with books of tickets from which a coupon is detached for every ride. The book itself must be presented for passage, and the child offering a coupon from it in payment of fare must ride on the regular school trip for which the large bus is used. By making these provisions the children are prevented from delaying after school to visit among themselves or go to the movies.

"One of the large buses that we formerly used has been sold, but the other is being held for possible emergency use. The new thirty-seat bus not only solves the problem of caring for the school children, but it gives us a vehicle adequate to our needs on Saturday afternoons and Sundays. These are heavy days. The mills and shops shut down on Saturday afternoon all year round, and our schedule is so arranged that ample time is provided between trips for patrons to shop in Willimantic or attend the movies in the afternoon.

"As I indicated before, I have been in the game long enough to know something about costs, and for this reason I have set up a depreciation reserve of 25 per cent a year. But we take care of our vehicles. In the interest of good service tires are watched very carefully. At the first sign of real wear they are pulled off and new ones put on. The auto is a synonym of motion, and the bus must be kept rolling uninterruptedly over the road. To insure this our three drivers have all come up through the shop. They are mechanics as well as chauffeurs. Our garage is equipped for general repair work and we have a night man at \$30 a week whose job it is to go over the buses each night and see that they are in good working order for the next day. Our drivers are paid 50 cents an hour for a nine and a half hour day."

Danielson to Providence									
Miles	Fare	Leave Danielson	7:15 A.M.	10:30 A.M.	1:45 P.M.	3:45 P.M.			
5.7	10	St. E. & W. 1/2	7:30	10:40	1:50	3:50			
9	15	State Lake	7:40	10:50	2:00	4:00			
13.3	20	Highway M. & A.	7:55	11:05	2:15	4:15			
15.9	25	Highway	8:05	11:15	2:25	4:25			
18	30	N. & S. 1/2	8:15	11:25	2:35	4:35			
20	35	Arrive Providence	8:30	11:40	2:50	4:50			

Providence to Danielson									
Miles	Fare	Leave Providence	8:50 A.M.	12:10 P.M.	2:30 P.M.	4:50 P.M.			
20	35	N. & S. 1/2	9:05	12:25	2:45	5:05			
18.7	30	Highway M. & A.	9:15	12:35	2:55	5:15			
15.9	25	Highway	9:25	12:45	3:05	5:25			
13.3	20	State Lake	9:35	12:55	3:15	5:35			
10.4	15	St. E. & W. 1/2	9:45	1:05	3:25	5:45			
5.7	10	Arrive Danielson	10:00	1:20	3:40	6:00			

Danielson to Willimantic									
Miles	Fare	Leave Danielson	7:15 A.M.	10:30 A.M.	1:45 P.M.	3:45 P.M.			
4	10	Highway	7:30	10:40	1:50	3:50			
9.4	20	Highway	7:40	10:50	2:00	4:00			
12.4	25	State Lake	7:50	11:00	2:10	4:10			
15.1	30	N. & S. 1/2	8:00	11:10	2:20	4:20			
20.3	40	Arrive Willimantic	8:20	11:30	2:40	4:40			

Willimantic to Danielson									
Miles	Fare	Leave Willimantic	8:45 A.M.	12:10 P.M.	2:30 P.M.	4:50 P.M.			
4.4	10	N. & S. 1/2	9:00	12:20	2:40	5:00			
9.2	20	State Lake	9:10	12:30	2:50	5:10			
12.7	25	Highway	9:20	12:40	3:00	5:20			
15.3	30	Highway	9:30	12:50	3:10	5:30			
20.3	40	Arrive Danielson	10:00	1:20	3:40	6:00			

*Reproduction of Interstate Bus  
Line schedules*

The drivers are all fully uniformed. As part of their equipment they carry a change maker. A stub system of tickets, that of the Macdonald Manufacturing Company, Cleveland, is used. As the accompanying illustration shows, this ticket contains the names of the stops and the fares between points. As the passengers are picked up they are asked their destination by the chauffeur. After paying his fare each passenger is handed a ticket, which is torn off to show the points of origin and destination and the amount paid. When the passenger leaves the bus he returns this ticket to the driver. Thus the latter is relieved of responsibility and the way is closed to any possible dispute with the passenger.

Small packages are handled for storekeepers who desire speedy delivery, but the person to whom the package is consigned is required to

be on hand to receive the package when the bus arrives at his particular station. For this service a charge of one half the regular fare is made. This charge is paid by the person who receives the package. The package service has proved very popular and the revenue from it has become quite an item.

The drivers start out in the morning with \$5 in change supplied to them from the office, and at the end of the day they turn in their cash receipts plus the \$5 in change and their stubs for the day. The stubs are then checked against the cash returns and the amount entered in the day book. Mileage records are kept from day to day by reading the speedometer. Gas and oil are all supplied at the headquarters in Danielson. There the drivers set down on a slip which is changed daily the records of the oil and gas used.

Time-tables have been supplied liberally to stores and shops along the route of the bus and in the terminal cities the schedule is inserted in the official time-table of the Connecticut Motor Stage Association, Inc., and drivers are supplied with printed schedules for distribution among patrons. On occasion the time-tables have been published in Providence, Danielson and Willimantic papers, but the need does not appear to exist for advertising the service regularly.

On the Willimantic-Danielson end the bus operates all the way over the state highway. This road is kept open all winter by the state. It is well protected as regards snow, but for the present winter snow fences have been put along stretches that in previous years have proved



*International Harvester bus chassis with thirty-passenger  
Paterson body*

to be bothersome. While as indicated before no trips have ever been lost on account of snow, Mr. Barnett proposes to be doubly fortified against any such contingency and has arranged to purchase a plow of his own. Some years ago when he was operating the Danielson-Dayville line Mr. Barnett established a reputation for himself as a snow fighter by getting nearly all his buses through on time when the steam railroads and trolleys were shut down and many employees of the Dayville mill living in Dayville were unable to get to work at all.

So far as terminals are concerned that problem is settled in Danielson by dispatching buses from the office of the bus line garage. In Willimantic buses are dispatched from a stand under the footbridge over the tracks of the New Haven Railroad on Railroad Street near the station depot. Plans are being made by the

bus men operating into Willimantic to have a station of their own, the expense to be shared by all the lines. A store to be used for this purpose has already been hired. Mr. Barnett will participate in this arrangement. At the stops in the small villages the local storekeeper is more than willing to have the bus patron use his store for a station while waiting for the bus.

The running schedule calls for only a mile in a little more than four minutes, showing that safety has been made a first consideration. All in all, the residents of the territory covered may justly be proud of the service and the equipment of the Willimantic-Danielson and Danielson-Providence lines. As for the proprietors, they have pointed the way to the results that can be achieved by alternately using large and small capacity vehicles over the same route.

other two are taken by the baggage agent.

The same procedure is followed at the second changing point and at the terminal, so that when the run has been completed a record of each piece of baggage is available at both ends of the line and at the two points where transfer was made, and all of this is accomplished with but one entry on a waybill and the signatures of successive drivers or agents who have assumed responsibility for the baggage.

On the coast route a different system is used suited to the fact that a single company, the Pickwick Stages, takes the passenger for the entire 454-mile trip. On starting this trip the passenger signs a 2½ x 5-in. tag for each piece of baggage he checks and the tag is attached to the baggage, no receipt being given to the passenger. The tag bears, in addition to the signature, starting point, date, time of departure, destination and, if there are two or more pieces of baggage checked on the same ticket, a figure denoting the number of pieces.

With this method when baggage is distributed at destination each passenger can be required to identify his grips by pointing them out to the driver or baggage agent and may also be required to give the name written on the tag. This system requires no bookkeeping and has been found to work out well.

## Tag-Waybill Scheme Carries Baggage on Connecting Systems

**M**OTOR stage operation in California was begun with the system of indiscriminately accepting passengers' baggage to be stowed in the baggage boot and leaving it to each passenger to "identify" his property when reaching his particular destination. As traffic increased a better system was needed, and now in traveling from San Francisco to Los Angeles by either the coast or the valley route, each piece of baggage taken on the stage is separately tagged. Each of the two stage systems has its own methods of checking and the features of each method are described in the following.

On the valley route the passenger traverses the systems of the California Transit, the Valley Transit and the Motor Transit Company, buying a through ticket but changing stages at points where these systems meet. Before boarding the stage at the starting point the passenger checks his grip at the baggage window, the baggage agent punching the ticket held by the passenger and giving him half of a duplicate-numbered tag, the second half of which is attached to the grip. Destination is marked with a rubber stamp on both halves of the tag.

Before the stage leaves, the baggage agent enters on a waybill the

VIA  
**PICKWICK STAGES**

FROM SAN FRANCISCO  
TO LOS ANGELES

OWNER \_\_\_\_\_

SCHEDULE \_\_\_\_\_ DATE \_\_\_\_\_

LIABILITY FOR LOSS OF OR DAMAGE TO BAGGAGE LIMITED TO AMOUNT STATED ON FACE OF TICKET

*Form of baggage check used by  
Pickwick Stages*

tag number and destination of each piece of baggage. Three carbon copies of this waybill are made simultaneously so that there are, all told, four copies. Just before the stage starts the baggage agent, who has attended to the loading of the baggage, gets the driver's signature on the waybill, and delivers to him the three carbon copies, retaining the original for record at the point of departure.

At each stopping point along the line the driver glances over his baggage waybill and checks off any pieces delivered. On reaching the end of his run, namely, the point where transfer to the other company's system is made, he turns over to the agent all baggage still remaining in his charge and gets in exchange the baggage agent's signature on the waybill which he is carrying in triplicate. One of these three copies he retains and the

## Loud Speaker Makes for Passenger Comfort

**W**HEN a stage draws up to the loading platform in the Union Stage Depot in Portland, Ore., the station master picks up the transmitter connecting with a "loud speaker" of a Magnavox type of radio amplifier and announces the line and destination of the vehicle ready to be loaded. Becoming accustomed to this form of announcement, the passengers are content to wait their stage while sitting comfortably in the waiting room instead of besieging the doors through which they are permitted to pass as soon as the stage is pulled up ready to be loaded.

The transmitter is so connected that the battery is used only when a button, conveniently placed near the point whence the station master can see the loading platform, is pressed to close the circuit. Thus the cost of operation is very low.

## Driver Punches Fare Receipt Only Once

Serial Number Takes the Place  
of Date Marks Ordinarily Used—  
The Printing Cost \$1 a Thousand

**S**HOWN below is a fare receipt designed by E. V. Hull, manager of the Blue Ridge Transportation Company, Hagerstown, Md. This form of receipt, Mr. Hull believes, will solve many of his fare collection difficulties. This is how it works:

The fare receipt or ticket is printed by a local printer at a small cost. When bought in quantities the cost ranges from a dollar per thousand upward. Any number of fares may be printed on it to cover each fare point or stop from a minimum of 5 cents to \$5 or more.

cate on the opposite side. A perforated or heavy dotted line is printed on the front so that it may fold over, allowing the figures on the duplicate or reverse side to come in alignment. This allows the punch holes to be made on the same set of figures on both sections of the ticket. After the proper fare has been punched the free or perforated end is torn off the stub and given to the passenger as a receipt for the amount of fare paid. By using the prepayment system of fare collection, it positively insures the collec-

5	25	50	75	1.00	2.00	3.00
N <sup>o</sup> 96				HULL'S BUS LINE		
Good for One Continuous Passage						
10	15	20	25	30	35	40

5	25	50	75	1.00	2.00	3.00
N <sup>o</sup> 96				HULL'S BUS LINE		
Good for One Continuous Passage						
10	15	20	25	30	35	40

*Ticket combines fare receipt, traffic check and financial record*

The top view shows the receipts issued to the drivers as they appear in pads of fifty before being folded. The lower view shows how the passenger half of the

receipt is folded back on the driver's stub so that when it is punched, a record of the fare paid is kept by the driver for settlement purposes.

The tickets are serially numbered and carry the name of the owner or bus company. They may also have the day of the month, if desired, but if numbered this is not necessary as the serial numbers may be taken when issued to the driver. The tickets may also be printed in colors for use on different lines or for such days for which special records may be desired.

Each driver is given a pad containing fifty of these receipts or tickets, with a punch for indicating the amount of fare paid by the passenger. The fare is collected at the time the passenger boards the bus.

One illustration shows the ticket or receipt as it comes on the pad. Another shows it folded over ready to be punched by the driver. The ticket is printed in duplicate—the original on one side of the paper or very light cardboard and the dupli-

cate on the opposite side. The receipt will also prevent disputes between passengers and drivers as to whether the fare has been paid and whether the correct amount has been collected.

At the end of the day or run all unused cash receipts are turned in and all stubs on the driver's portion of the ticket are turned in at the office, together with the cash settlement according to the punches on each ticket. In case a receipt is spoiled the whole ticket is turned in marked "void" and is not detached.

### ACCURATE RECORD SECURED

By use of this duplex ticket collection system an accurate record of traffic may be had for any part of the line or in either direction. The words "In" and "Out" are printed and punched on the ticket. Schedules may be made from records of

ticket collection so that fuel may be added during certain hours or taken off when traffic will not meet the needs of operation.

## Temperature and Gasoline Volume

**R**ETAIL dealer in gasoline may sometimes lose a fourth of their profits in warm weather because of the effect of temperature on volume, according to a paper presented at the Annual Conference of Weights and Measures by Howard R. Eitel, sealer of weight and measure at Flint, Mich.

Sales of gasoline in carload lots are always corrected for temperature, he stated, the correction for a 20-deg. change in temperature amounting to nearly 2 gal. in a hundred. This is made necessary by the expansion of the gasoline with increase of temperature.

The gasoline is taken to the filling station in a tank truck, where in summer it has a temperature of 85 deg. and often more. It is put in an underground tank in which its temperature is lowered to 65 deg. and is sold at that temperature.

The result is that the dealer sells the motorist nearly 2 per cent more gasoline in a gallon than was in that gallon when he bought it. The dealer's profit on 100 gal. is at or \$2, and if, through failure to take account of temperature changes, he loses 2 gal. that makes his loss about 50 cents, or a fourth of his profit.

The error resulting from a 20-deg. change in temperature is nearly four times the tolerance allowed in the measurements made by gasoline filling devices.

## Census Reports Show Wonderful Motor Growth

**S**TATISTICS compiled by the U. S. Census Bureau show some interesting figures regarding the growth of the automotive industry. The rate of growth between 1914 when it was examined by the Census Bureau and 1919, the figures for which have recently been announced, was almost twice that of the increase which came about between 1909 and 1914. The capital stock invested in the industry is shown to reach a total in 1919 of \$1,780,918,952, four times the investment of 1914. Three times as many motor vehicles, including commercial cars, were manufactured in 1919 as in 1914.

# Driver-to-Office Forms Serve as Day-by-Day Barometer of Bus Line Earnings

*By Roy H. Swint*

Portland, Ore.

**A** SUBJECT most important to the bus line operator is the study of gross earnings. It is from gross earnings that net profit is derived, and by clearly analyzing all revenue, its source and its distribution, the net profit can be increased.

Systems of all kinds have been devised by operating managers to secure data regarding revenue, a few of which are illustrated herewith. Not all operators approve of the same system. Often a system designed and approved by one operator may be discarded by another. The reason most generally offered is the length of time it takes to tabulate the necessary data. A well-designed report blank not only gives all desired information but should be simple in form.

The gathering of data begins with the driver. He should be well instructed on how to fill out these report blanks and also be permitted to see statements compiled from them in order that he will better appreciate the importance of a correctly rendered report.

## SOURCES FOR TRIP REPORT

A passenger's cash fare receipt that is considerably used is shown in one of the accompanying illustrations. This receipt is made in two sections and perforated so as to be easily torn apart. The sections are folded in such a manner that when the driver punches the point of origin and destination of the passenger and the amount of fare collected on the passenger's portion, he records the same information on the stub he retains—after handing to the passenger his half of the receipt. These cash fares, together with tickets collected, are entered on a driver's trip report. Under this system a separate report blank is used for each one-way trip.

Space is also provided on this trip report to show the leaving time from the terminal, the name of terminal,

date, trip number (for convenience in referring to trips each is numbered), mileage traveled and gallons of gasoline taken on. If desired gasoline could be measured for each trip by filling the tank, but where layovers at the end of the run are of but short duration this may not be possible, in which case the gasoline consumed during the day is generally pro-rated by trips. The subject of gasoline consumed and reason for entering on this report does not enter into a discussion of earnings and will, therefore, be discussed later. Space is also provided to enter the car number used and the driver's signature.

All fares collected are listed on the driver's report. These are divided to show the number of each class of passengers, their point of origin and destination, the number riding on tickets and the ticket value, and the number paying cash fares and the amount paid. The total number of passengers, the number of tickets and the amount of revenue is totaled at the foot of the report. Express packages and other revenues are listed in like manner.

The second form of driver's report shown was designed to reduce the amount of writing required in the form previously described. It gives the same information and is favored in some cases. Instead of writing in the name of stations, the driver merely enters the number of passengers carried in the proper space and at the extreme left extends the value of tickets over to the ticket or cash column, as the case may be.

While this type of report may save considerable writing on the part of the driver, it does not show the facts as clearly as the form of the Motor Transit Company. For example, three passengers are carried from Portland to Newberg, fare 90 cents each. The driver follows down the Portland column and follows the Newberg column to the left, entering the figure "3" at the junction of columns. Two more passengers are

The driver is the key to securing revenue data. Details of his reports can be tabulated to compare operation by trip, day or month. Here described are all the forms needed to show where the money comes from and when. Their use helps to detect unprofitable trips, and to measure increase in business and profits of individual vehicles.

carried from Tigard to Newberg, fare 55 cents. The driver enters the figure "2" in the space as shown. In extending amounts over to the ticket column, the \$2.70 representing the three fares between Portland and Newberg and the \$1.10 representing the two between Tigard and Newberg are combined and only the total \$3.80 is carried out. By using this means of extension it takes more effort to compile a statement of receipts between stations than from the first form of driver's report shown. The report, however, saves writing by drivers and has its users as well as any other form.

## GETTING VEHICLE COSTS

A monthly receipt sheet is often kept to tabulate the revenues of each car operated, regardless of the schedule run. This form has a line for each day of the month and columns in which to enter the following: Number of passengers carried; receipts divided, tickets and cash; gallons of gasoline; miles traveled, and receipts from express and chartered trips. The total column shows the whole business for each day. For purpose of cross reference only, a column is provided to show the number of trips each car is operated.

At the end of the month it is possible to ascertain from this record the average number of miles traveled per gallon of gasoline consumed, the revenue per vehicle-mile run, as well as other information that may be desired. If accurate cost systems are kept, it will also be possible to obtain operating costs for each car per month, which then can be shown on an individual mileage basis. Deducted from the gross revenue per car, it is easy to obtain the operating

Portland-Newber M. Munville Tillamoc Stage Line, Inc.

Leaving From \_\_\_\_\_

Arriving At \_\_\_\_\_

DATE \_\_\_\_\_

TIRE CHARGES

EXPENSES

ADDRESS \_\_\_\_\_

EXPRESS \_\_\_\_\_

3

TRIP RECEIPTS									
Date	Loc	Part	Loc	Part	Loc	Part	Loc	Part	Loc
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
Total									

**CAR RECEIPTS**

Month 19 Car No.

Day  Part  Loc  Part  Loc

1  2  3  4  5  6  7  8  9  10

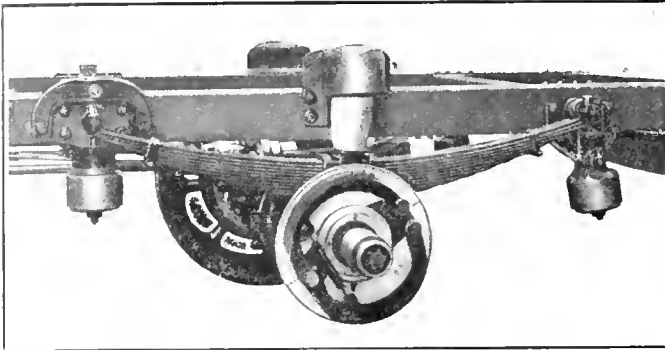
11  12  13  14  15  16  17  18  19  20

21  22  23  24  25  26  27  28  29  30

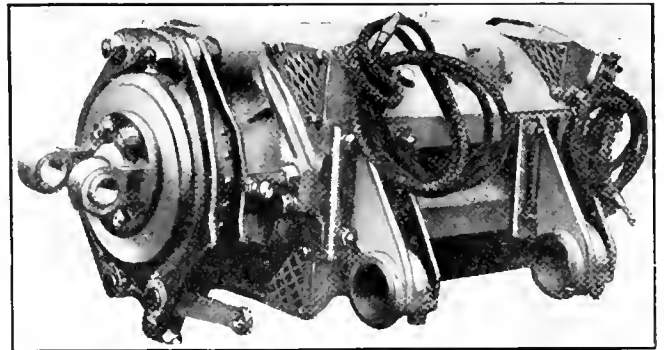
31  Total

5

Not all operators are of the same opinion regarding the value of these statistics. Some maintain that their compilation entails too much work, and expense. As before stated, the entire process of securing the data rests with the drivers. Intelligent drivers, properly instructed, have no trouble turning in well-made reports. Tabulating, if attended to daily, means but a small amount of work.



*Close-up view of rear-wheel spring connection, showing the internal expanding brake*



*One of the motors of the Birmingham trolley bus, with the emergency brake shown at the left*

## Birmingham, England, Installs Double-Deck Trolley Buses

WHAT the *Tramway & Railway World*, London, considers the most important service of railless trolley cars yet introduced in Great Britain, or any other country, has just been commenced by the Birmingham Corporation's tramway department. On a route which extends from Broome Square in the center of the city of Nechells, a suburban district about 3 miles to the northeast, the tramway cars have been replaced by double-deck trolley buses. These will be operated on a four-minute headway. The replacement was made because the tramway line was worn out and it was considered cheaper to put in the trolley buses than to reconstruct the railway. The buses have a capacity of fifty-one seated passengers, twenty-six below and twenty-five above.

Twelve of these buses are under construction by Railless, Ltd., London.

The spring system in the Birmingham bus is of special interest, the main spring being semi-elliptic with supplementary rubber springs placed on top of these at the middle. The auxiliary springs come into action with full and overload. In the spring hangers of the rear springs are rubber shock absorbers.

## Gasoline Growing Better

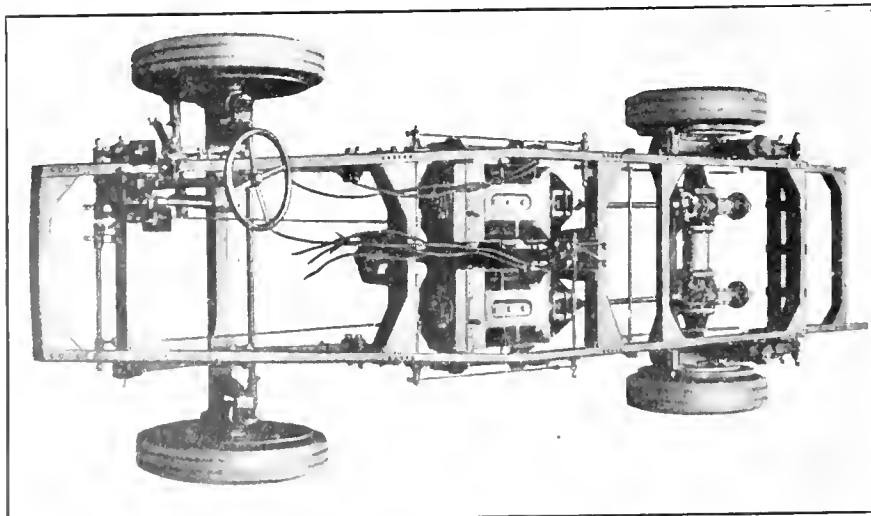
DAY by day, little by little, the quality of gasoline marketed in the United States seems to be getting better, states the Bureau of Mines as the result of a survey recently completed. This, the seventh semi-annual survey of its kind made by the bureau, covered the cities of New York, Washington, Pittsburgh, Chicago, New Orleans, St. Louis, Denver, Salt Lake City, San Francisco and Bartlesville, Okla. It disclosed

the fact that the increase in volatility of gasoline, noted six months ago, is still present. This means that the average gasoline is easier to vaporize and consequently that it should be easier to start on a frosty morning.

Another important fact developed is the tendency toward greater uniformity in the character of gasoline marketed in the United States. Gasolines bought in New York, Chicago or Denver are apt to be more nearly similar than has been the case in the past. The bureau finds also that the seasonal variation from summer to winter gasolines is slowly decreasing.

On the other hand, of 129 samples of gasoline collected from these ten cities fifty-six samples failed to meet federal specifications. New York is the only city in which all gasoline samples passed federal specifications at all points.

In the present survey, taking the cities individually, there are some distinct changes noted. In comparison with January, 1922, the average for Washington shows an increase of 20 deg. in the initial boiling point and a decrease of 12 deg. in the 90 per cent point. The averages for Pittsburgh, Chicago and St. Louis each show consistent drops throughout the distillation range with the



*This plan view of the Birmingham trolley-bus chassis shows particularly the motor mounting and the method used for gearing the motor shafts to the driving wheels*



exception of the initial boiling point, which was increased slightly. On the other hand, the averages for Salt Lake City and San Francisco indicate, on the whole, a decrease in volatility. The average 90 per cent point and end point of the San Francisco samples each rose 11 deg., while the same

points of the Salt Lake City samples rose 8 and 2 deg., respectively.

Detailed information regarding the seventh semi-annual motor gasoline survey is given in Serial 2444, by N. F. Le Jeune and L. G. Marsh, which may be obtained from the Bureau of Mines, Washington, D. C.

## Typical "Stage" and Bus Used in California Passenger Service

**T**WO distinctly different types of California passenger carriers known as the bus and the "stage" are shown in the accompanying illustrations. The term "stage" is there applied to the elongated touring car that has side doors for each seat instead of a center aisle, as in the case of the bus. A third type with longitudinal seats and center aisle which is well known throughout the country is also used to some extent in California. However, California has a smaller percentage of the longitudinal-seat type than do the Eastern states and a relatively large proportion of buses and stages, particularly the latter because of the many relatively long routes.

The bus shown has seats for twenty-five, in addition to the driver, and is typical of those used for local service or for intercity runs, particularly in southern California where considerable roadside business is done. There is only the one entrance shown at the front, on the right side of which is the fare box. The tabs seen at the top of each window draw down celluloid curtains. The pipe bumper at the rear has been found effective in preventing damage to the bus body from minor rear-end collisions. The locker just forward of the rear wheel is used for small express packages and for a spare tire. Note the convenient grab handles. Practically all the buses of this type operated by the Motor Transit Company use dual tires on the rear end, which can be done with standard valves when using the steel wheels shown here. (See BUS TRANSPORTATION for March, 1922, page 172.)

While the stage shown is a type now probably more popular in California than any other passenger motor carrier, this particular bus happens to have an all-steel body, the first of this style car tried by the California Transit Company. If it proves successful steel is to be substituted for the wood frames

heretofore used exclusively. The wood frames have been very satisfactory, the selected oak and ash members being mortised, glued and screwed together to give a maximum of strength and rigidity. The steel body, however, would have advantages in economy, speed of construction and convenience of repair. This stage has a wheelbase of 218 in. It has seats for twenty passengers, of which two are "jump-seats" in the rear end or smoking compartment and two are in the same seat with the driver. The other seats are

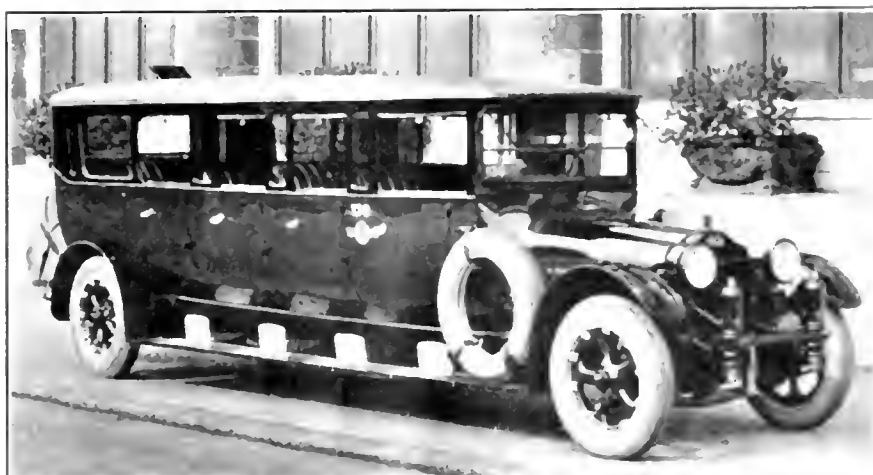
wide enough to allow ample room for four passengers.

Transverse celluloid curtains can be drawn down from the top of the car and fastened to the backs of the first and third seats, thus closing off into separate compartments, as it were, the second and third seats. These two seats are considered the ladies' compartment. With the exception of the rear seats, each has its own celluloid curtains on either side that can be drawn down to keep out wind or rain. The side windows for the rear seat, as well as a small panel on each of the others, are made of plate glass.

The two rear seats are considered the smoker and in addition to the ventilator in the top, narrow side windows are provided on either side. These are made of metal and are held at any desired width of opening by means of an articulated brace with a thumb screw at the joint. Baggage is carried in the canvas covered rear boot. Compressed air shock absorbers are standard equipment for nearly all stages of this type.



*Type for interurban service that handles local traffic. Note rear bumper, steel wheels for dual rear tires and locker for express and spare tire.*



*Type known as "stage," the most popular in California. Note smokers' side windows and top ventilator at rear, also rear boot for baggage. This stage has transverse celluloid curtains to divide into "compartments."*

# BUS TRANSPORTATION

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CARL W. STOCKS  
Editor

THE purpose of *Bus Transportation* is to help develop bus transportation wherever and whenever it contributes to the public welfare. We believe that only through a sense of public service, through responsible management, through the proper co-ordination of bus and rail, through adherence to sound principles of business, engineering and ethics bus transportation can develop into a stable and enduring industry.

New York, December, 1923

## *Mr. Mellon Reduces the Tax Problem to Its Simplest Terms*

**I**NHERENTLY sound are Secretary Mellon's tax reduction proposals. Above all else they have the value of being specific. It is in this respect that the Secretary has confounded the politicians for the time being. Their first line of defense has been to try to indicate that so far as the bonus is concerned we may have our cake and eat it too. In the light of Mr. Mellon's specific figures, it is, indeed, difficult to see how this can be brought about. Certainly the arguments to this end so far advanced by adherents of the bonus are not convincing. The decision that the politicians will be called upon to make will be to choose between the approval of the comparatively inconsequential number of war veterans and some 7,000,000 income taxpayers. The fact is irrefutable that \$2,122,293,644 has so far been expended in one form or another by the national government alone in aid of the incapacitated war veterans, while the average taxpayer has been compelled to go along without any amelioration of his tax burden.

The evidence thus far presented in favor of the changes suggested by Mr. Mellon is more than sufficient to be convincing. Sight must not be lost of the fact, however, that most of the representatives of the public in Congress are politicians first, last and all the time, with their ears close to the ground to catch the sound of the coming wave of popular opinion. The advance guard in favor of the Secretary's suggestions has made its approach audible at Washington, but the demonstration should be made so forceful and so continuous that doubt can not be left in the minds of the legislators as to what the rumblings mean. Whether the changes suggested are enacted into law depends, however, upon the way in which the advantage thus far gained in the form of an aroused public opinion is pressed home upon the representatives of the public in Congress. It is not enough to rest content with the thought that perhaps the end desired by the majority will be reached without further effort just because more people are touched intimately by the Secretary's proposals than there are adherents to the plan to make additional payments in the form of a bonus.

## *Motor Buses Should Not All Be Classed "For Hire"*

**A**NOTHER phase of the income tax problem, in so far as it interests the motor bus industry, is the special tax levy of \$10 and \$20 provided in Sec. 5512, Par. 11, dealing with passenger automobiles for hire. The Internal Revenue Department has ruled that this section applies to all passenger carrying motor vehicles used for the public carriage of passengers irrespective of the class of service in which they are engaged. This section of the law reads as follows:

Persons carrying on the business of operating or renting passenger automobiles for hire shall pay \$10 for each such automobile having a seating capacity of more than two and not more than seven, and \$20 for each such automobile having a seating capacity of more than seven.

There appears to be no reason, now that the last of the transportation taxes are to be eliminated according to Secretary Mellon's plan, why the motor bus industry should be called upon to continue paying transportation taxes. The motor bus has been recognized as one of the basic mediums of transportation, and only recently did the U. S. Chamber of Commerce urge its co-operation with rail services the better to serve the country. It would seem therefore that this part of the country's transportation is being penalized with taxes primarily designed for an entirely different class of vehicles.

Even a brief examination of the situation will show that all rubber-tired public service conveyances cannot be classed as vehicles for hire any more than a vehicle operating over rails and performing a similar class of service. It would be just as sensible to say an ordinary train or street car was "for hire," and it does not seem that any court or board of review would permit the Treasury rulings to stand as the proper interpretation of this section.

Frankly, it would seem that the rulings of the Internal Revenue Department stretch the language of the statute, which seeks only to tax passenger automobiles used in call and demand service.

Here is an opportunity for the various associations interested in the motor bus industry to get together and urge either the entire abatement of this tax or a change in the Internal Revenue Department rulings to exempt from the tax motor vehicles operated solely over fixed routes on regular schedules.

—[ EDITORIAL ]—

## *Who Will Clear the Highway?*

**T**HERE is no sound reason why motor vehicles that pay yearly license fees should be forced to quit during the winter months, simply because they happen to be operated in the snow belt, while those in more favored parts of the country can keep on running. It may not be possible to measure the inconvenience caused by snow-blocked roads, but certainly it is of very great importance and bears alike not only on all highway users, but on all communities and people served by the highway.

Some bus companies are keeping their routes open at their own expense for the convenience of their patrons. The rates of fare charged must be

sufficient to cover this added expense, so in the last analysis it means a tax paid by the bus passengers.

What is required, and what is bound to come as people appreciate fully the economic value of the highways, is the inclusion of snow removal in the highway maintenance. This maintenance is a function of state or county highway departments, and it is up to them to keep the highways clear of snow wherever there is a sufficient travel demand to warrant the expense. Then, too, it seems that snow removal will lower other or general maintenance costs, since a smooth running surface is less wearing on the road than one filled with holes or ruts that must stand excessive shocks for several months during the winter.

The good work has already started. Connecticut, Michigan, and Maryland are keeping their main highways passable the year round. Pennsylvania and New York are taking an important part in the snow removal movement, because of the large number of trucks and other motor vehicles operating between their principal cities.

An example of what bus operators can do is furnished by what is going on in northern New York. The motor bus association there has joined with motorists and dealers in a state-wide campaign to keep the main highways cleared of snow. An effort will be made to amend the laws so that the New York State Highway Department will be required to clear all highways that carry a considerable amount of traffic, say, 500 vehicles in a twelve-hour period. This campaign has been undertaken after it was found that the law covering snow removal passed two years ago in New York had been ineffective. The main reason for the failure of this law was that it permitted counties and towns to make appropriations for snow removal on the highways, but was not mandatory. A contributing factor to the failure seems to be a lack of organized sentiment in favor of snow removal.

Bus owners in general will do well to get behind any movement or campaign that will help to keep the principal roads open the entire year.

—[EDITORIAL]—

### *Tips from a Transportation Relative*

**M**ASS transportation is mass transportation wherever you find it. Consequently the experience of related branches is often of direct help to the carriers of passengers in flexible highway vehicles. Recent developments in the aircraft fields, in its efforts to introduce commercial aviation, present a striking example of the close relation existing between modes of transportation.

Commercial aviation, so called, has made little progress since the armistice was signed five years ago. Discussing this at a recent meeting of the Society of Automotive Engineers, Prof. Edward P. Warner of the Massachusetts Institute of Technology predicted that the remedy was large-scale operation. It would be easier, he held, to find passengers for twenty ten-passenger airplanes today between New York and Washington after the lines had been operating for six months on that scale, than it would be to fill three four-passenger ma-

chines between the same points and after the same period. Bulk of traffic would not of gave assurance of safety and would appeal to that instinct to follow the crowd which is nearly universal.

He brought up another point which will also be appreciated by bus operators. That is, the necessity for financial support to bridge over the early years at the beginning of operation. Capital may be hard to get for an undertaking which has to devote the early part of its history to gaining public confidence rather than to making a profit.

In the bus field it is comparatively easy to get this confidence during the first year or so of operation, but it is not always so easy to keep up equipment and retain public good will during the second and third years. These are the critical periods when good service must be given if the enterprise is to prove a final success.

Two qualities stand out in the bus operators, and their number is constantly increasing, who have passed successfully through the fire of the early years. First, they are open-minded, to study and use what others are doing. Second, they are iron-fisted, to put good ideas into effect and make them stay put.



### Good Words from the Mountains

DENVER, COL., Nov. 15, 1923

TO THE EDITOR:

Inclosed please find renewal of our subscription to BUS TRANSPORTATION for another year. We appreciate your paper very much and would not like to operate buses without its inspiration.

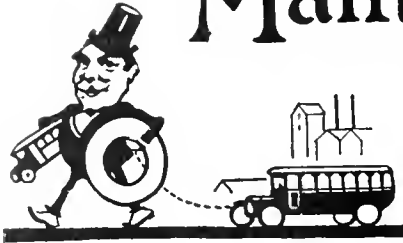
As a bit of news, you might state that on Oct. 1 the Colorado State Public Utilities Commission denied our application for a franchise from Denver to Colorado Springs, Pueblo and Canon City, but gave us a certificate of convenience and necessity from Denver to Greeley, Greeley to Fort Collins and Greeley to Nunn, Col., a distance of something more than 100 miles. The Greeley to Collins and Greeley to Nunn are new divisions which we have not been operating but are opening these routes today. We have been operating, however, over the southern routes mentioned above until Oct. 1 when they were discontinued, but we have hopes of getting these divisions later on.

We have been operating for eleven months, having traveled more than 100,000 miles and carried more than 70,000 passengers with only one personal injury case, which we think is an enviable record. We might add that the reason that our mileage is so great for the number of passengers carried is that we were for some months operating some long runs which did not prove successful and were later taken off. Our present operations are successful and developing all the while.

COLORADO MOTOR WAY, INC.,

R. W. James, General Manager.

# Manufacturers' Section



Developments in equipment for vehicles, garages, terminals—all the improvements manufactured for the industry.

## Traffic Warning Has Three Signals

THE "Cloverlite" direction signal, which is put out by the Los Angeles Sales Company, Los Angeles, Cal., is being used to a considerable extent on the Pacific Coast buses. As told recently in BUS TRANSPORTATION, this device is standard equipment on the bodies



*Direction signal with three parts, as installed on Pacific Coast buses*

built during the summer by the Pacific Electric Railway.

In addition to the ordinary "Stop" light operated from the brake pedal, the signal has two other lights, to indicate intention to turn. The "right" and "left" lights are operated by a slight pressure on push buttons mounted at the top inner side of the steering wheel rim. Thus traffic can be warned of the driver's desire at any time in advance of making the turn, but the "stop" signal is not actually shown until the brake is applied.

All three parts of the signal are connected with a pilot light on the steering column, which lights when any one signal is used and continues

to burn as long as any of the three are on. Thus the driver knows instantly in case any part of the signal fails to work.

Since the "left" and "right" signals are red and green respectively, while the "stop" signal is red, the result after the brake is applied is the showing of two brilliant red lights in the case of a left turn, or one red and one green light in the case of a right turn, thus most effectively signaling the driver's attention.

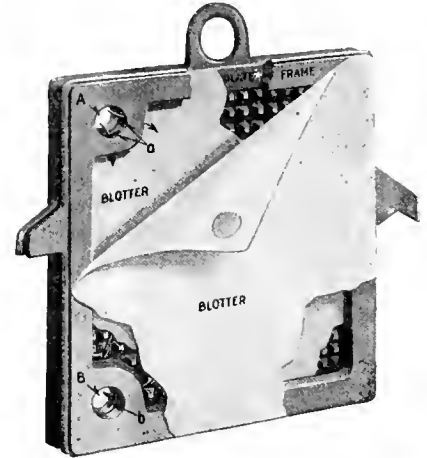
The "Cloverite" direction signal has been approved by the Motor Vehicle Department of the State of California, where the law requires that mechanical or electrical devices to be used for rear signaling must be approved by the department.

## Outfit to Reclaim Crankcase Oil

IN ORDER that users of motor vehicles can dehydrate and purify large quantities of oil successfully and with a minimum of expense, the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has developed a special type of filtering outfit for this service.

These outfits are made in five sizes, divided into two classes according to the size of the blotting or filter paper. There are three larger sizes rated at 10, 20 and 30 gal. per minute, and two smaller sizes at 2½

and 5 gal. per minute. A complete outfit consists of a filter press, electric motor, pump, oil strainer, pressure gage, and piping. Sizes up to and including 10 gal. per minute are mounted on an iron base cast with a high rim that forms an inclosure

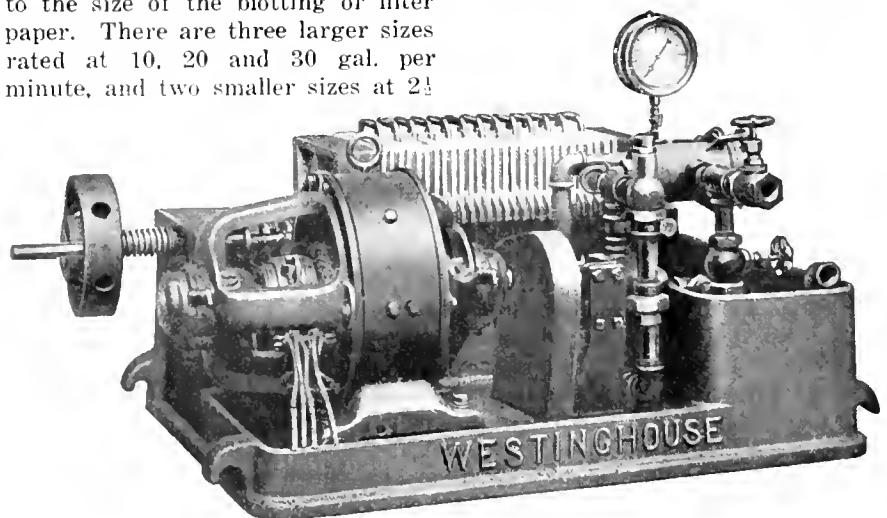


*Assembly of one filter-press plate and one filter-press frame, showing oil chambers between each two blotters*

and serves as a drip pan. Other (larger) sizes are mounted on a structural iron base and have a sheet metal drip pan.

The filter press proper is made up of a series of flat cast-iron plates and frames assembled alternately with blotters or filter papers between them. By means of a screw and lever and a movable cast-iron end block, the plates, frames and blotters are forced tightly together. The plates and frames are cast with holes in upper and lower corners, as shown in the assembly.

When the outfit is working oil enters under pressure at the top cor-



*Ten-gallon oil-drying and purifying outfit*

ner through the inlet formed by the holes A in the assembly of frames, plates, and filter papers. It then passes through the A slots or openings in the frames and fills the chambers between each set of two filter packs. From these chambers the oil is forced through the filter papers that form their sides, since there is no outlet opening. The filter paper thus takes up all the moisture and screens out all sediment from the oil. After passing through the filter paper, the oil flows along the grooves formed by small knobs, of pyramid shape, on both sides of the plates to the opening b in the lower corner of the plates and thence out through the outlet B.

The filter paper used is a special grade of white blotting paper about 0.025 in. thick. It is prepared from wood pulp and contains no coloring matter or chemicals that might injure the oil. Five sheets, cut to the proper size with hole punches to correspond with the holes in the filter plates and frames, are used between each plate and the adjacent frame.

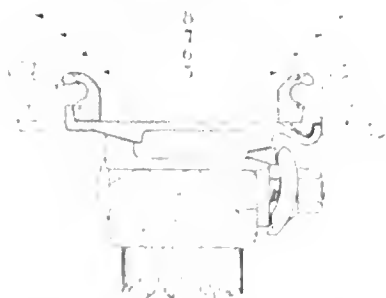
To obtain the best results in treating the oil it is absolutely necessary that the filter paper when first placed in the filter press be entirely free from moisture. Filter paper will invariably absorb moisture if exposed to the air for any length of time and must be thoroughly dried under heat before it is used; specially constructed drying ovens have therefore been designed for this purpose.

### Rims Standardized for Doughnut Tires

THE Firestone Steel Products Co., Akron, Ohio, has announced a complete line of interchangeable rims designed particularly for the new 20-in. rim tire. The equipment includes four sizes, designed to be interchangeable on the 6-in. felloe.

The new rims, to be known as Type "B," are being manufactured in 30x5, 32x6, 34x7, and 36x8 sizes. All of these will mount upon the standard 32x6 wood felloe band or steel felloe, using the same clamping ring, bolts, nuts and clamps.

The Type B rims are made with two removable side rings, instead of the inside flange being integral with the rim base. This new construction is said to facilitate removal of the tire since pressure can be applied from either side. In case of injury the ring only need be re-



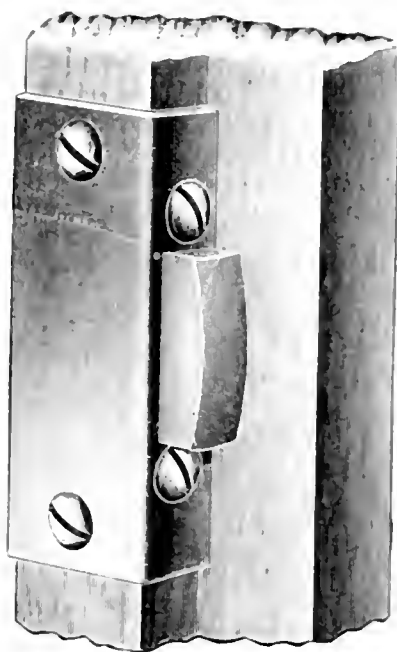
*Section of felloe recommended for four sizes of "doughnut" tire*

placed, instead of the complete rim as is now necessary. The spring locking ring is made of high carbon steel, to hold the tire securely and insures firm seating. Drive plates are of a heavy type to withstand extreme circumferential strains.

A similar construction is used in a line of 24-in. rims, in 34x5, 36x6, 38x7, and 40x8 sizes. All of these fit a standard 36x6 felloe.

### Screwdriver Adjustment for Door Bumper

THE Autoquip Manufacturing Company, Inc., Rochester, N. Y., has brought out a bumper designed for bus doors, as well as for those of closed automobiles. The main feature of this is that adjustment is made by turning the two screws shown above and below the rubber striker or bumper. As the rubber wears it can be turned out, and there is 1 in. to wear off before the bumper need be replaced. This is said to be sufficient to last from three to four



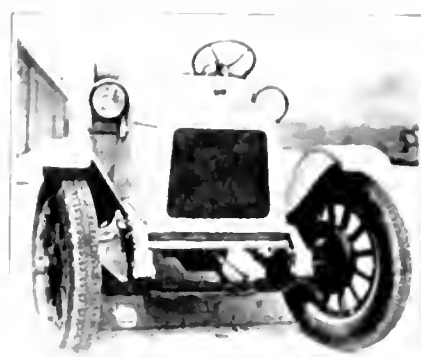
*Door bumper with adjustable feature*

years. On account of this feature it is unnecessary to shut up the bumper with cardboard, as with the ordinary type.

### Front Wheel Brake on Light Chassis

THE Betlehem Motors Corporation of New York, with headquarters at Allentown, Pa., has announced that its Airline 1 ton model will hereafter be fitted with four-wheel brakes. The heavier designs for 2 and 3 ton capacity will shortly be available with brakes on all wheels.

As indicated in the photograph, the front brakes are the two-shoe-



*These front brakes equalized by cross rod mounted on axle*

expanding type and are self-equalizing. The front axle and brakes are made by the United States Axle Company. A brake rod shown above the front axle pulls a lever, which in turn opens up sleeves on an operating shaft carried underneath the axle and leading to toggles at each brake. Inasmuch as these shaft sleeves are free to move longitudinally the pressure is equalized on the levers at both ends. The wheel brakes are fully inclosed, but are said to be easily accessible.

### Kuhlman Body Shown at Atlantic City

THE body marked No. 1 on page 520 of the November issue of BUS TRANSPORTATION was a product of the G. C. Kuhlman Car Company, Cleveland, Ohio. It was said to be a Brown eighteen-passenger type, when as a matter of fact the view represented a Kuhlman body with twenty-five seats. However, both the bodies mentioned were displayed during the Atlantic City convention of the American Electric Railway Association, on Federal six-cylinder bus chassis.

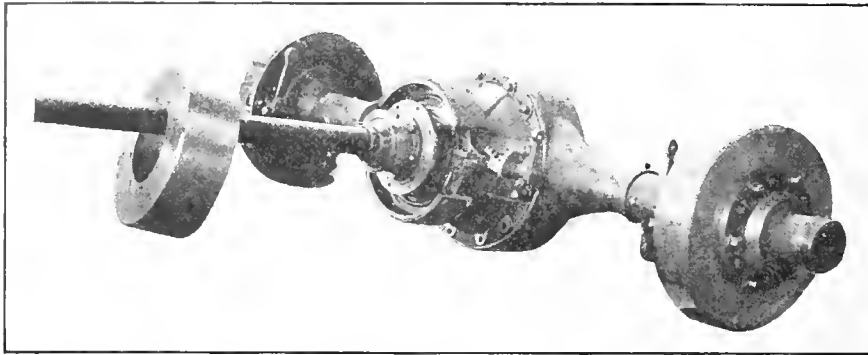


## Shaft and Wheel Brakes Carried on Same Axle

AS A step in the direction of better braking systems, the Vig-Tor Axle Company, Cleveland, Ohio, is offering the new type of rear axle shown here. This is novel in having one set of brakes ( $2\frac{1}{2} \times 14$ ) for the rear wheels and what is

sign. This job is of the bevel gear type, with drive pinion mounted in a one-piece carrier between two ball bearings. Wheel gage for the model 307 design is 56 in., allowable load on spring pads is 3,000 lb., and spring centers may be from 37 to  $40\frac{1}{2}$  in. apart. Reduction ratios from 5.45 to 3.77 are available.

The company expects to build a



*Bevel-drive axle with shaft brake mounted on housing. Cover shown hung on shaft is bolted to flange on universal joint*

usually called a transmission brake, but in this case mounted on the axle instead of on the chassis frame. In other words, the second brake is of the shaft type incorporated in the rear axle.

The  $3 \times 12$ -in. shaft brake, it is said, will operate even when moistened with oil drawn from the drive shaft. Braking pressure is equally distributed to the two wheels and can be regulated either to slow up the vehicle gently or to slide the road wheels.

Of the internal, cam-opened type the  $3 \times 12$ -in. shaft brake is actuated by a pair of gear sectors as shown in the photograph. These sectors are so proportioned, it is said, as to give a full throw of the cam for a short movement of the pedal controlled by the driver. For this reason the lining can wear for a considerable time and still the brake requires no adjustment.

To replace the lining, the brake drum is removed by unscrewing the bolts attaching it to the companion flange. The drum is then pushed over the universal joint and out of the way, the shoes unlocked and exchanged and the drum put back again.

Among the features of the model 307 axle, which is designed for taxicab and light-duty bus service, are the shim adjustments of drive pinion and wheel and the use of two bearings in each wheel in connection with the semi-floating axle de-

complete line of front axles as well as rear axles of the heavy-duty type. The latter will be of internal-gear construction.

## Air Spring Combined with Bumper

THE Westinghouse Air Spring Company, New Haven, Conn., has recently brought out a heavy-duty shock-absorbing device. This is  $3\frac{1}{2}$ -in. size, which supplements the 3-in. and  $2\frac{1}{2}$ -in. sizes that have been previously on the market and are still supplied for medium and light duty bus equipment. For the latter chassis the recommended equipment is a full set of air springs, front and rear, while for the heavy jobs, front end equipment only—that is, two air springs—is usually found satisfactory.

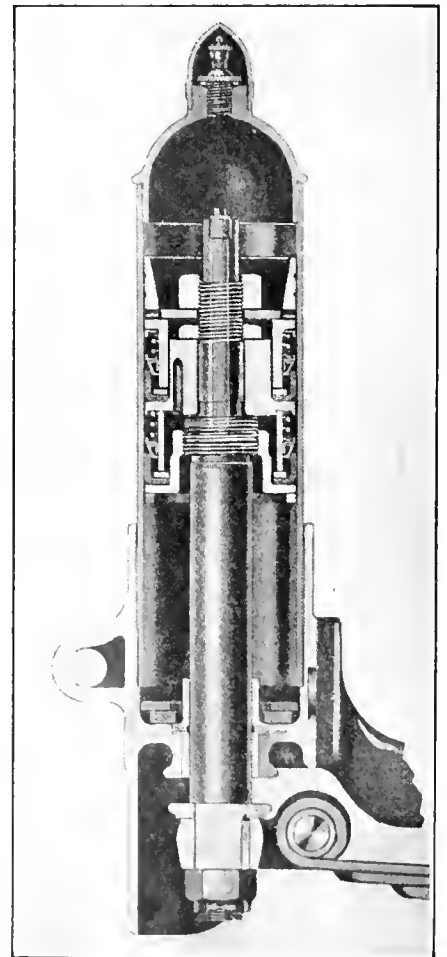
In the drawing is shown a typical Westinghouse design. The outer shell, which is cut away to show the working parts, is rigidly attached to the frame of the vehicle. Inside this shell is a moving member, which is connected at the bottom to the main springs.

The function of the air spring is to help cushion the load, to protect the delicate mechanism of the working parts of the chassis and to eliminate spring breakage and frame wrenching. In operation the piston-like moving member rides up and down against an oil-sealed cushion of

air inside the outer member. Once the springs are installed and satisfactorily aligned and adjusted, ordinary attention only is required, it is said, to keep the equipment in working order during the life of the vehicle.

The oil cup in the lower bearings should be filled at least once a week, and oil inside is replaced in the spring and fall only. It is also recommended that springs such as would be installed on the front of a twenty-five-passenger bus should carry about 115 lb. air pressure. The valve at the top of the spring is arranged so that an ordinary tire pressure gage can be used for checking. Present experience indicates that in bus service the springs will hold air for at least 5,000 miles.

The heavy-duty model air spring can be supplied with a special bumper which is attached directly to the shells of the air springs. This bumper is made of channel iron with hardwood filler and is furnished with bolts and bolt holes.



*Cross-section of typical air spring. Outer shell attached to chassis frame and inner (moving member) to main spring*



## Passengers and Light Freight Handled

A MODERN substitute for the old-time four-horse stage-coach is the vehicle shown in the accompanying illustration, recommended for maintaining scheduled passenger, parcel and mail service by its manufacturer, the International Harvester Company of America, Chicago, Ill.

Besides two roomy cross-seats facing forward at the front for a driver and five or six passengers, there are two folding side seats in the rear on which can be accommodated six to eight passengers. Access to the front seats is gained by doors at the right-hand running board, while a step is provided for taking on passengers at the rear. With the rear seats folded back, moreover, a large compartment is available which can be used for baggage, express or mail.

The baggage or parcel compartment with seats folded back is 62 in. long and 36 in. between protecting strips on bottom of folded seats. In-

side, the vehicle is 60 in. wide. There are four drop windows on each side, which permit ample air circulation in warm weather. In addition to the doors on the right-hand side, and the double doors giving access to the rear compartment, there is a driver's door at the left of the steering wheel. This stage is mounted on a Model S International chassis and operates at 25 to 30 m.p.h.

## Two-Piece Piston Ring

THE Kendell Motor Products Company, Fort Wayne, Ind., is putting out a piston ring of two-piece construction; an inner or expansion ring, and an outer or packing ring. The expansion ring is of the even-radius type, so it is said to be especially useful for slightly out-of-round cylinders. This part of the ring also contains a non-clogging oil wiper.

The outer ring is of softer iron, and is turned with an inner surface on a 55-deg. angle. The same angularity is used on the external inclined



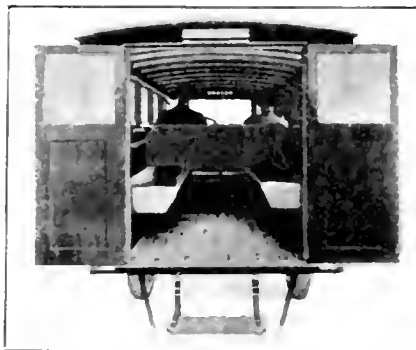
*Cut open view showing expansion and packing ring*

face of the expansion ring, to increase the pressure on the circumference, in the hope of lengthening the life and also preventing carbon.

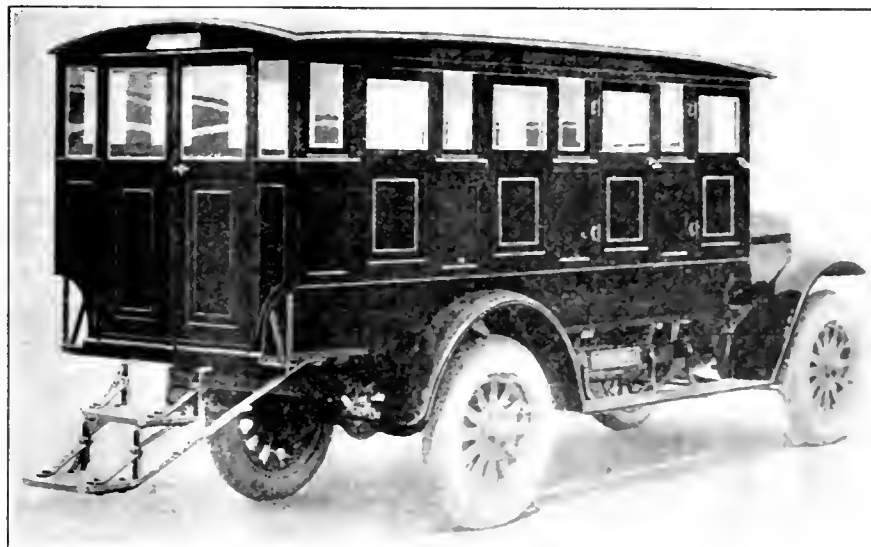
## Non-Skid Tread Used on Cushion Tire

THE United States Tire Company, New York, N. Y., has brought out a cushion tire of the construction shown in the accompanying drawing. This is now being supplied in the following sizes: 32x4, 34x4, 36x4, 34x5, 34x6, 36x6, 36x7 in.

The tire is mounted on a split base, between the two parts of which is an interlocking spacer ring. A hollow central cavity permits the rubber to bulge inwardly at the walls, and thus relieves deformation at the sides above the base band channels. As a result of this construction, it is said that under standing load the



*Use of rear compartment. At left, seats folded up and carrying light freight. At right, side seats in position for passengers*



*International motor stage showing passenger entrances on right-hand side and at rear. Mounted on model S chassis.*



*Section of United States cushion tire, showing non-skid tread and side-wall shoulder set*

cushion tire gives a deflection equal to the fully inflated pneumatic, and under moving impact a cushioning effect that approaches the pneumatic tire. The maker recommends that a given size of cushion tire be used to carry the same load as the next size smaller solid tire; a vehicle properly equipped with 5-in. solid tires should be fitted with 6-in. cushion tires.

# Condensed Specifications of Motor Vehicles for Bus Service

[illegible]

# What the Associations are doing



News and happenings  
of the associations.  
Proceedings of interest  
to the bus transporta-  
tion industry.

## Commerce Chamber Report Discusses Bus Operation

Co-ordination of Rail and Bus Lines Recommended by the Special Committee  
Appointed to Study Relations Between Carriers—Adequate Regulation  
Deemed Necessary to Equalize and Stabilize Bus Transport as  
Compared with Rail Passenger Service

RECOGNITION of the service rendered by the motor bus and the value of its use in co-ordination with existing transportation systems is an important feature of the report just issued by the special committee of the United States Chamber of Commerce appointed by the president of that organization to consider the "Relation of Highways and Motor Transport to Other Transportation Agencies."

In the summary of conclusions reached by the committee, three points are of special interest to bus operators. They are:

"To insure to the public continuity and reliability of service, sound financial organization of motor transport is necessary, as well as public regulation of common-carrier motor service.

"Passenger bus transport should be so regulated as to secure the best service to the public, certificates of public convenience and necessity as already required in many states being a useful means of insuring reliable and continuous service. Rail lines can often advantageously extend or supplement their service by bus lines, and in states where this is now prohibited such restrictions should be abolished."

In that section of the report dealing with passenger transportation the committee has this to say:

"Bus service may be classified as (1) tourist service, (2) de luxe service in urban districts, (3) non-competing service, (4) feeder service to rail carriers, and (5) parallel competitive service.

"The first and second classes depend upon the willingness of the public to pay a higher rate for a more agreeable form of transportation. The first class is exemplified by the development on the Pacific Coast, where by combinations of routes it is possible to travel from Portland to San Diego on lines operated on schedules with published tariffs. The traffic is so heavy on some of these lines that space must be booked a week ahead.

"The second class is illustrated by the operation of the Fifth Avenue Coach Company in New York City, where a 10-cent fare is willingly paid for a slower ride than on the 5-cent subways a few blocks away.

"The third class, which embraces the independent lines, that connect communities not connected by rail, or traverse urban and suburban sections without rail transit, renders a necessary service to the public, and feeds into, rather than draws business from, the rail lines.

"There can be no question as to the desirability of free play in the development of motor service for any of these four classes.

"In the case where the motor bus offers a service parallel and practically identical in quality with the electric (or steam) railroad two questions must be answered: Is the service of the rail carrier adequate and satisfactory to the

public? If not, can the rail carrier make it so?

"There exists today an almost unanimous opinion among those who are qualified to judge that the motor vehicle may be used to supplement the electric railroad service in such a manner that the transportation needs of the community will be most efficiently met by the provision of a complete system of transportation, under the supervision of a single reliable agency, rather than by individual transportation units.

"The problem must be analyzed from the standpoint of the entire community.

"Nearly every large urban electric railroad has lines which are at present unprofitable to operate. They may reflect bad judgment on the part of an earlier management, or shifting population that has taken away traffic they once had, or they may have been built under public compulsion. In any event, the companies have heretofore been compelled to continue to operate these lines, with a resultant drain upon the revenues from their more remunerative lines and a lessening of their ability to render adequate service to the entire community.

"It seems reasonable that in such a case the railroad should be permitted to substitute bus for rail operation, or that if an independent bus company be granted a certificate of convenience and necessity to operate a parallel service substantially similar in quality, the railroad company should be permitted to abandon the unprofitable rail line."

## Bus and Trolley Work Together in California\*

By D. W. PONTIUS

Vice-President and General Manager  
Pacific Electric Railway, Los Angeles, Cal.

IT WOULD seem pertinent that I continue the subject of "Trackless Transportation" on which I addressed the association at Chicago last year, and supplement the remarks I made at that time (see BUS TRANSPORTATION, October, 1922, page 547) with a review of the present situation relating to the progress made in trackless transportation in southern California.

Last year the estimate was that there were 380 buses and trucks operated directly in competition with the Pacific Electric, with an annual operating revenue of approximately \$3,325,000. At this time, a close estimate is that there are 396 competitive buses and trucks with an annual revenue of approximately \$3,750,000.

The number of operating bus companies has not increased and no new applications of a paralleling or competitive nature have been granted during the past two years.

The increase in bus and truck revenue of competitive lines is attributed to the

continued phenomenal growth of southern California in population. Better to illustrate this growth, the population of Los Angeles in 1920 was 576,000; in 1921 was 611,000, in 1922 was 722,000 and in 1923 is 987,000.

In the city of Long Beach, where two bus companies with seventy-seven buses were operating on a 5-cent fare, the situation is unchanged and we cannot justly complain, as they are not permitted to parallel the Pacific Electric lines.

In Pasadena, a year ago, we were facing not only the problem of track renewals to cost in excess of \$750,000, but had directly paralleling bus competition. The railway company stood ready to make the necessary expenditures, but because of the political situation the city authorities felt that the people would not approve of ruling out the paralleling bus service over the same streets where car lines were operated.

A very satisfactory street car service, augmented by bus service, is now being given, and every one seems satisfied. At this time we are operating forty-five buses, and, with shops and

\*Abstract of a paper before the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 8-11, 1923.

garage headquarters, have a total investment in trackless transportation in the city of Pasadena of approximately \$500,000.

#### SPIRITED CONTEST IN LOS ANGELES

Probably the hardest battle ever sustained by electric transportation companies to retain their right to serve a city, to repel an alien interest and to protect itself from unwarranted and unfair competition was made in Los Angeles recently. It culminated in an election wherein the people were to decide whether the existing railways—the Los Angeles Railway and the Pacific Electric Railway—were to be permitted adequately to serve their transportation needs, or a franchise was to be given the People's Motorbus Company to establish bus lines.

The franchise applied for was directly to parallel the street car lines on the same streets. The result of the election was the defeat of the People's Motorbus Company franchise by over 12,000 votes out of \$6,000 cast.

My prediction is that within another year the Los Angeles and Pacific Electric Railways, through the Los Angeles Motorbus Company, will be operating in Los Angeles more than 100 buses, and will have an investment in trackless transportation in the city of more than \$1,000,000.

#### EXTENSION OF FEEDER SERVICE

In addition to the bus service installed in the city of Pasadena and in Los Angeles the Pacific Electric is now operating feeder or auxiliary bus lines, as a part of its railway system, in the cities of Santa Ana, Alhambra, Beverly Hills, Glendale, San Bernardino and Redlands, and within the next six months we shall have in operation fifty buses as feeders to our interurban system.

In a great many instances the bus lines are being operated at a slight loss, taking into consideration operating expenses, interest, depreciation and taxes; however, the loss should not be looked upon as a serious matter for the reason that the bus service has been installed to take care of the growing traffic in districts not served, instead of extending electric lines.

#### Time-Tables Boost Work of New York Association

AT THE annual meeting of the Auto Bus Association of New York State, held in Syracuse on Nov. 14, arrangements were made with the American Highway Educational Bureau, Washington, D. C., to issue a bus line time-table covering activities of its members. The form of folder will follow closely the standard 4 x 9-in. pocket size and will be issued quarterly. The cost to the members will be less than if the association had carried out its plan as outlined at the previous meeting. A payment of \$36 per year carries with it not only the right of inserting all its route time-tables, but a free distribution based on 20,000 copies to be printed

### Meetings, Conventions and Exhibits

- Nov. 14-15—Auto Bus Association of New York State, Grand Hotel, New York, N. Y.
- Dec. 10-15—National Petroleum Institute, Annual Meeting, Statler Hotel, St. Louis, Mo.
- Dec. 18—First Annual Meeting of Motor Bus Association of Virginia, Richmond.
- Jan. 1-12—National Automobile Show, Fifth Coast Artillery, Albany, N. Y.
- Jan. 1-7—Society of Automobile Engineers, Body Builders Association, Waldorf Astoria Hotel, New York, N. Y.
- Jan. 11-13—Annual Road Show of the American Road Builders Association, at the Coliseum and Greer Bldg., Chicago.
- Jan. 22-26—Society of Automobile Engineers, Annual Meeting, Detroit, Mich.
- Feb. 16-23—14th Annual Show of the Albany Automobile Dealers Association on the Passenger cars, trucks, tractors and accessories, State Armory, Albany, N. Y.
- March 8-15—22nd Annual Show of the Boston Automobile Dealers Association, Inc., and the Boston Commercial Vehicle Dealers Association, Inc., Passenger cars, trucks, tractors and accessories, Merchants Bldg., Boston, Mass.

quarterly, among hotels and in the buses. Paid advertising will be carried, as this will provide a wider field for distribution and likewise cut the cost of issuance. The association's name is to appear on the cover. The first issue will be out in the spring of 1924.

#### GROWTH IN MEMBERSHIP

President Stanley Chatterton, Lima, presided at both the morning and afternoon sessions. Secretary Dadd reviewed the activities during the year. His report showed a considerable growth in association members, the total now exceeds fifty. Completion of the necessary papers of incorporation of the association, he stated, had been made as voted at the previous meeting. After these had been duly signed by the requisite number of members, the secretary was instructed to take the necessary steps for filing.

Two amendments were voted to the constitution and by-laws. One dealt with changing the location of the annual meeting from Rochester to a place to be designated by the president; the other withdrawing temporarily its membership in the National Motor Transport Association. While the need of a national association was recognized, it was the consensus of opinion that the existing arrangement required a greater outlay of funds than the returns at present warranted.

Secretary Dadd was instructed to secure samples of a plate that could be put in each bus signifying membership in the association, the cost not to exceed \$1 each. Likewise a plate to signify that the bus was insured through the Mutual Casualty Company, Buffalo, under the arrangement now existing between that company and the association. Since the co-operative insurance arrangement has been in effect nearly \$30,000 worth of insurance has been

underwritten, at a cost of 1 per cent to the member. Effective next July a further reduction in premiums is planned.

A representative of the New York State Insurance Fund, Edward F. Carr, also spoke in regard to compensation insurance, which under the new law bus operators employing staffs of more than twenty will be required to carry.

#### NEW OFFICERS ELECTED

Officers elected for the coming year are as follows: President, E. W. Carpenter, Black River; vice-presidents, L. A. Watters, Ives, I. H. Heseman, Danville; W. M. Abtract, Syracuse; L. M. Cave, Rochester; C. W. Stokes, New York City, and Stanley Chatterton, Lima; J. J. Dadd, Rochester, was re-elected secretary from last year.

In view of organization of the association will endeavor to have passed at the coming session of the legislature at Albany in January, a bill providing that the annual meeting will be held at the Hotel Grand Central, Syracuse, on Dec. 12. It is hoped there will be a large number of bus operators present at this meeting, as the new removal and insurance bills will receive final consideration.

#### Vermont Operators Organize

BUS OPERATORS in Vermont have formed an association. It was organized recently at a meeting in the Hotel Berwick, Rutland, and is called the Motor Bus Owners' Association of Vermont. The meeting was called by J. B. James of North Bennington, operator of the former Bennington-North Bennington Bus Line.

The following officers and directors were elected: President, H. E. Bliss of Swanton Motor Bus Co., Inc.; vice-president, R. T. Lane of the St. Albans and Burlington and Cambridge Junction and Burlington routes; secretary, George F. Rousseau of the Grand Isle Motor Bus Company; treasurer, R. A. Willys of the Lackard & Willys Transportation Company; directors, first, John B. James of the Bennington and North Bennington route; second, F. A. Jewett of the Montpelier and Burlington route; third, F. G. Spooner of the Rutland and Castleton route; fourth, C. D. Orton of the Fairfax and Burlington route; fifth, to be appointed later.

Much enthusiasm was shown at the meeting and the organization promises to be of much benefit to its members. An effort is being made to enroll all owners of bus lines in the state, so that the influence of the association will extend all over Vermont. Application forms have been sent to all owners not present at the meeting. The public is demanding such service as the bus lines are giving, and it is felt by the association that only such regulations are necessary as cover the protection of the traveling public and property owners; and that any further interference from outside sources is uncalled for at present.



## Big Year for Ohio Bus Men

**Annual Meeting of Motor Bus Owners' Association Shows Steady Progress—  
New Mutual Insurance Company Cuts Premiums—Regulatory Law Passed  
and Its Enforcement Approaching—President-Elect Sanborn  
Stresses Real Service to Public**

**F**ILLED with enthusiasm and confidence in the future of the bus transportation industry, eighty-five members of the Ohio Motor Bus Owners' Association gathered at the New Southern Hotel in Columbus on Nov. 14 for their annual business meeting and dinner.

The morning was devoted to reports of committees, election of officers and plans for the future. A tour of Columbus by motor bus occupied the afternoon, and the evening dinner, under the able leadership of Toastmaster J. F. Carlisle of Columbus, furnished a fitting climax to a profitable and enjoyable day.

At the opening of the morning meeting President R. E. McCollum of Columbus welcome the assembled members and guests. The minutes of the last meeting and reports of officers were accepted by the association.

### REPORTS OF COMMITTEES

The governors of the various districts in the state, reporting on conditions in each district, commented on the favorable progress being made by the association. A total membership of 200 was announced. In some districts a membership of 100 per cent among independent bus operators was reported.

Mr. Carlisle of Columbus, chairman of the legislative committee, stated that the present motor bus code had been drafted after a careful study of the codes and ordinances adopted by other states and municipalities. It had been prepared and presented primarily from the standpoint of improving the status of buses and insuring adequate service and protection to the public.

M. E. Blackburn, chairman of the insurance committee and general manager of the Ohio Motor Mutual Insurance Company, outlined the progress made in establishing a mutual insurance organization which by eliminating very largely the overhead selling cost of old line insurance companies would furnish insurance to members of the association at cost. This association was now writing its insurance at rates 25 per cent under those charged by old line companies, Mr. Blackburn said, and the extremely low losses incurred over a period of three months indicated a substantial profit which would be available for distribution as dividends. He also pointed out that, under the arrangement adopted, concentration of control in the hands of any small number of members is avoided. No one member is allowed to take more than \$500 worth of stock in the agency company formed to finance the operation of the mutual organization.

In order to encourage independent bus operators to become members of the association, a motion was passed

reducing the initiation fee from \$50 to \$25 until Jan. 1, 1924. A resolution, urging the State Board of Control to appropriate not less than \$50,000 for the administration of the new motor bus law, was also adopted. The association passed a recommendation that its members co-operate with the Ohio Motor Mutual Insurance Company and subscribe to the stock of the agency company.

### NEW OFFICERS ELECTED

The following officers and board of governors were elected for the ensuing year: President, Ralph W. Sanborn, Cleveland, president Cleveland, Ashtabula, Conneaut Bus Company and secretary Cleveland Akron Bus Company; vice-president, M. E. Blackburn, Cleveland, director Ultimate Bus Company, Martins Ferry; board of governors, first district, built around Toledo, E. C. McAtee, Toledo; second district, built around Cleveland, A. J. Miller, president A. J. Miller Transit Company, Canton; third district, built around Belaire, B. S. Mackey, president Ultimate Bus Company, Martins Ferry; fourth district, built around Cincinnati, V. H. Nobis, president New Richmond Bus Company, New Richmond; fifth district, built around Dayton, C. S. Stoner, president Dayton-Xenia Bus Line, Xenia; sixth district, built around Columbus, J. F. Carlisle, Columbus.

### ENTHUSIASM AT DINNER

At the evening dinner Herman A. Schaffer, chief of motor bus division Ohio Public Utilities Commission, assured the members of the association that the new certificates were being issued as rapidly as conditions would permit. Gordon Lee of the Fageol Motor Coach Company of Ohio described briefly the important part which the motor bus is playing in the development of the transportation industry throughout the world.

Charles Gordon, associate editor of BUS TRANSPORTATION, commended the association for the progress which it has made in a single year of activity and also for the broad viewpoint taken toward its problems. The association's action in organizing a means of providing adequate insurance for its members was an indication of real and substantial progress, he held.

The effect of the passage of the new motor bus law by the Ohio Legislature was described by Hon. Frank B. Mauler, member of the Ohio Public Utilities Commission. The Legislature, he said, had done wonders for the bus business by putting it on an entirely different standing before the public.

President-elect Sanborn closed the meeting by sounding again the keynote

of the association's program. "Real service to the public is the most important thing for bus owners of Ohio and the entire country to keep in mind," he said. To insure this service, he recommended weekly meetings of drivers for the purpose of impressing on them the importance of safety and courtesy. The work of the publicity committee and all other activities of the association would be largely nullified if the paramount idea of safety in bus transportation was not successfully built up in the minds of the public. He further stated that in many instances electric railways have been unsuccessful in obtaining favorable legislation because of failure to build up a spirit of confidence in the minds of the public, due to disregard in the past of the importance of applying merchandising methods to the sale of transportation.

### Legislation and Time-table Feature Connecticut Activities

**W**ITH sixty-three members attending, as well as state officials and others interested in the industry, the annual meeting of the Connecticut Motor Stage Association, Inc., held Nov. 2 at New Haven, furnished an interesting record of the past years' work of officers and committees.

The report of Treasurer C. C. Wells for the year was read by Secretary E. T. Gildea, and indicated the association to be sound financially. Receipts from dues amounted to \$1,817, while disbursements totaled \$1,624, leaving a balance of \$213.

President Patrick Healey pointed out that through the board of directors the association had obtained a 12½ per cent reduction in the liability insurance rate. This represents a minimum saving of \$40 a year per bus, and was secured after the insurance people had studied the low accident records of the bus operators on file with the commission. A further reduction might be obtained, perhaps by some other means of writing the same protection. Insurance companies believed, he said, that ultimately the bus men will make their own rates, based on experience.

Mr. Healey pointed out also that the association had been responsible for the introduction of three bills in the last session of the Legislature. It had considered a fourth one dealing with insurance regulation, which had been given up after the rate reduction previously mentioned had been secured.

One bill aimed to make the certificate of convenience and necessity granted by the Public Service Commission irrevocable except for cause and then not until after public hearings and further appeal to the Supreme Court. Even without the bill the Public Service Commission had always acted in full faith to the bus men of the state.

Another of the bills introduced sought to increase the allowable number of standees, now limited to two. This was discussed with the State Motor



## Motor Bus Organizations

**NATIONAL MOTOR TRANSPORT ASSOCIATION:** President, Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; manager and secretary, E. B. Burritt, 59 West Ninth Street, New York, N. Y.

**ARIZONA MOTOR TRANSPORTATION ASSOCIATION:** President, D. C. O'Neil, Douglas, Ariz.; secretary, E. A. Jones, 127 North Central Avenue, Phoenix, Ariz.

**MOTOR CARRIERS' ASSOCIATION:** President, W. E. Travis, president California Transit Company, San Francisco, Calif.; secretary, James G. Blaine, 1299 Bush Street, San Francisco, Calif.

**CONNECTICUT MOTOR STAGE ASSOCIATION:** President Patrick Healey, secretary and counsel Bridgeport & Waterbury Passenger Service, Inc., 36 North Main Street, Waterbury, Conn.; secretary, Edward J. Giblea, treasurer Congress Taxi Company, Danbury, Conn.

**DELAWARE BUS TRANSPORTATION ASSOCIATION:** President George A. Moses, treasurer West Chester & Wilmington Transportation Company, Wilmington, Del.; secretary, C. S. White, president Delaware Rapid Transit Company, Wilmington, Del.

**MOTOR TRUCK ASSOCIATION OF FLORIDA:** President, W. T. Callahan, Miami; secretary treasurer, D. E. Mc Mann, 36 N. W. 1st St., Miami, Fla.

**GEORGIA MOTOR BUS & TRANSPORTATION ASSOCIATION:** President, E. A. Harrison, Bainbridge, Ga.; secretary, W. M. Rilly, Decatur, Ga.

**INDIANA MOTOR BUS OWNERS' ASSOCIATION:** President, H. E. Jahns,

general manager Jahns Bus Line, Inc., Route 1, Indianapolis, Ind.; treasurer W. L. Benson, Jr., manager Indiana Motor Bus Company, Evansville, Ind.

**IOWA MOTOR TRANSPORTATION ASSOCIATION:** President, J. E. Ferguson, 1601 M. Ave., Iowa City, Ia.; secretary, Clark, 1988 Moines, Iowa.

**LOUISIANA MOTOR TRANSPORTATION LEAGUE:** President, W. A. Smith, 300 St. Charles Street, New Orleans, La.; secretary, L. H. Frank, 1400 Poydras Street, New Orleans, La.; treasurer, M. W. Walker, Alexandria, La.

**MICHIGAN HIGHWAY TRANSPORTATION ASSOCIATION:** President, G. J. McCullum, Detroit, Mich.; secretary, H. H. Holly, 10411 C. St., Detroit, Mich.; treasurer, Lansing, Mich.

**MINNESOTA MOTOR BUS ASSOCIATION:** President, Rodney S. Thompson, president Touring Car Bus Company, 29 Seventh Street, North Minneapolis, Minn.; secretary, Earl F. Johnson, Endicott Arcade, St. Paul, Minn.

**NEW JERSEY BUS TRANSPORTATION ASSOCIATION:** President, John Morring, 498 Warren Street, Newark, N. J.; secretary, Harry Busser, 100 Madison Street, Guttenberg, N. J.

**NEW JERSEY AUTO BUS ASSOCIATION:** President, George P. Schenck, Jr., 26 Clinton Street, Newark, N. J.; secretary, George L. O'Wen, 2 Clinton Street, Newark, N. J.

**AUTO BUS ASSOCIATION OF NEW YORK STATE:** President, F. W. C. Porter, C. P. Motor Bus Line, 1110 River, N. Y.; secretary and treasurer, James J. Dodd, president E. B. & H. Lines Advertising Company, 129 Avenue C, Rochester, N. Y.

**OHIO MOTOR BUS ASSOCIATION:** President, R. A. W. Thompson, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**PENNSYLVANIA MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**RHODE ISLAND MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**TENNESSEE MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**TEXAS MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**VIRGINIA MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**WASHINGTON MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

**WEST VIRGINIA MOTOR BUS ASSOCIATION:** President, J. H. Smith, 1000 Broadway, Cincinnati, Ohio; secretary, J. H. Smith, 1000 Broadway, Cincinnati, Ohio.

Vehicle Department, it being suggested that the seat allowance be changed from 18 in. to 12 in. per passenger, thus increasing the allowable load about 50 per cent. The matter was dropped after it became evident that such a change would not only affect the safety feature but also be likely to increase license fees and insurance rates.

The third bill introduced covered exemption from attachment of the buses in service. The legislative judiciary committee frowned upon this bill as unwise, holding that it asked for a special dispensation which could not be given to anyone else.

Another accomplishment of the association is the arrangement made with

the Perry Press of Union City, Conn., for printing quarterly in a convenient pocket size the time-tables of the bus lines in the state. So far two editions have been put out without expense to the members, the cost being borne by advertisements which had been secured by the printer.

Four new members were elected to the board of directors. Frank H. Geer, The Connecticut Motor Transportation Company, New London, was elected to fill the unexpired term of C. H. Belden, resigned. Those elected for three years were Harry Kabakoff, New Haven, and Frank Pobuda, Willimantic. The name of the other member will be announced later.

## Highway-Development Proposals at Meeting of Part Makers

AT THE convention of the Motor and Accessories Manufacturers' Association, held Sept. 19 in Boston, two papers of interest to all users of the highway were presented. A working program for financing highway construction and maintenance was proposed by Roy D. Chapin, chairman of the highways committee of the National Automobile Chamber of Commerce. A set of principles to control the special taxation of the motor vehicle was set forth by Harry Meixell, secretary of the Motor Vehicle Conference Committee, which represents motor users, dealers and manufacturer organizations.

After referring to the greatest obstacle which confronts the user of highway transportation today, that is, the

question of floor space for his motor vehicle, Mr. Chapin gave six principles of finance as follows:

(a) States in the initial state of highway development should issue bonds to defer that portion of the annual charge for construction which would overburden either property or the road user.

(b) States where original construction programs are well under way can, in the main, finance normal new construction from current funds, utilizing bond issue funds to defer the cost of special projects.

(c) States where original construction is largely completed are concerned chiefly with maintenance and reconstruction, and should depend on current funds in case of emergency.

(d) Toll maintenance of interstate and state highways should be a charge against the road user.

(e) Road paving a purely local purpose will naturally require only light upkeep and should therefore be a charge against the adjacent property, which in the case is the best and often the only beneficiary.

(f) No road should ever be improved to an extent in excess of its carrying capacity. The return to public in the form of economic traffic is the sole measure of such improvement.

The cost of highways, Mr. Meixell advocated, should be divided into two parts, the first or capital expense and the maintenance expense. Society as a whole should pay general taxes for the capital cost of improved highways. Motor vehicle interests should be called upon to pay special taxes to maintain these highways.

Based on this schedule of divisions of cost, Mr. Meixell's committee held that the amount of special taxes on motor vehicles should be limited. No more money should be raised through this method than is required to administer the state motor vehicle department and to maintain its improved highways. There should be but one form of special taxation and the agency for levying this should be the state. To permit the federal government, counties or local governmental bodies to levy special taxes is bound to result in excessive and unfair demands.

For three years the Motor Vehicle Conference Committee has worked to weld together all the automotive elements of the state. These should unite to educate the public and its lawmakers

to the acceptance of correct fundamental principles for special taxation. Using these principles, manufacturers, dealers and users of automotive products can determine whether a tax is fair or unjust. Once having done so, Mr. Meixell asserted, these automotive interests should remove from or prevent the placing of any improper special taxes upon the statute books.

The bus can do much toward solving traffic problems, according to H. W. Slauson, M. E. engineering service manager of the Kelly-Springfield Tire Company in a speech on the subject of traffic control—"America's greatest problem."

"Why could not existing trolley companies use their rail equipment for

long-distance hauling with no intermediate stops to take on or discharge passengers?" said Mr. Slauson. "The short-haul traffic could be handled by means of supplementary motor buses owned by the trolley company and operated either by gasoline, storage batteries or flexible connections with the overhead trolley wires. Such buses could stop at the street corners as easily as a private automobile and could carry all the local traffic with arrangements for transfers at points 1 or 2 miles apart at which the rail-bound trolleys could stop. The rail-bound trolley with its infrequent stops could then travel as fast as its own line of traffic would permit. Under this arrangement passengers would be carried more quickly."

## Michigan Highway Association Breaks Up Into Bus and Truck Groups

MEETING at Grand Rapids for the third consecutive time, the Michigan Highway Transportation Association held its annual convention on Nov. 20-21, with an attendance of 125 members. A well-balanced program, which included business sessions each day and a banquet on the evening of the first day, was initiated by an address of welcome from Mayor Julius Tisch.

The business meeting gave those in attendance an opportunity to enter into the discussion of the weighty questions of insurance and regulatory law. A rather unexpected occurrence at the convention, provoked somewhat by the recent regulatory law and the events immediately preceding its passage, was the resignation from the Michigan Highway Transportation Association of those members whose interest is solely trucking. Hence, this convention marked the birth of a kindred organization, namely, the Michigan Commercial Haulers' Association. This split in the parent association was made only after lengthy deliberation which brought out the desirability of separate meetings to discuss the individual problems of the two somewhat divergent industries.

The new regulatory law of Michigan, which was largely responsible for the break, places motor bus operation under the Public Utilities Commission control, but does not include the commercial freight haulers. This law, and its operation, was the topic of the second day's session, at which meeting a comparison was made between it and a similar law recently adopted in the state of Ohio.

Following the address of welcome by the Mayor, and the response by President Moreton of the association, Judge Ralph Sanborn, president Ohio Bus Owners Association, explained the purpose of his organization. Believing that the Ohio motor regulatory law is the finest in the United States, Judge Sanborn attributed its passage to the united efforts of the motor vehicle

operators of his state. Having a secretary who has had twelve years' experience in public utility work, the Ohio Association was well equipped to draw up a law which was reasonably sure of being passed. In presenting this to the Legislature the operators asked to be taxed an amount satisfactory to both the Legislature and the bus operators.

A discussion of insurance was provoked by a report of the association insurance committee, which stated that the formation of a mutual company at this time would be inadvisable. Inasmuch as the association as a body thus disposed of the insurance question, opportunity was afforded the individual members to hear from insurance agents on the various forms of insurance available. Representatives of mutual, stock, reciprocal, and old-line companies were heard from. M. E. Blackburn, of the Ohio Motor Mutual Insurance Company, explained the operation of that company, pointing out that whatever form of insurance is purchased, rates must cover the cost of the service rendered. This operator's mutual company returns to the operators profits accruing through reduction in losses as a result of careful operation.

### STATE OFFICIALS SPEAK

The banquet program included speeches from the Secretary of State of Michigan and the chairman of the Public Utilities Commission. Secretary of State C. J. DeLand gave an interesting talk indicating the necessity for additional funds with which to complete the state road-building program. Up to date, \$32,000,000 of the available \$50,000,000 road bonds have been issued, leaving only \$12,000,000 with which to complete the paving program requiring \$26,000,000. It is proposed to obtain this needed money by imposing a 2 cents per gallon gasoline tax. In his talk and in the moving pictures shown later, Mr. DeLand indicated the progress being made in road building both as to results and methods used.

Chairman W. W. Potter, of the Public Utilities Commission, speaking at the Wednesday morning session, pointed out that the motor regulatory law of Michigan was regulatory and not discriminatory. The commission could, under this law, grant certificates of necessity and convenience to operate over the same route or operate between termini in direct competition with existing steam and electric operation. The validity of this portion of the law is now being tried in the Supreme Court of the state. Mr. Potter went over every section of the law and supported the constitutionality and legality of every phase. In concluding, he called upon the association to tell the Legislature what they, as operators, want.

As a fitting comparison E. J. Shover of Ohio gave some results of the motor regulatory law of his state, explaining just how the various associations in that state bound themselves together and formulated a bill which stood a fair chance of being accepted. Commenting on the Michigan law, Mr. Shover deplored the fact that it was so short, and that it allowed anyone to make inroads on an established business which in turn deteriorated the service rendered to the public.

In a new business such as this transportation enterprise, it was unfortunate that Michigan proposed to add heavier burdens in the form of a gasoline tax to create highways which are really state institutions. Construction of roads should be carried on by general property tax, Mr. Shover believed, but maintenance of roads should be paid for by a tax levied on the user in proportion to his use.

Further explaining the Ohio law, Mr. Shover declared that municipalities were prevented from imposing unreasonable burdens on the through operator in the form of taxes. However, a small fee could be collected to cover the cost of regulating traffic, which additional regulation is necessary because of the increase in traffic due to the through truck or bus operation. Mr. Shover further emphasized Mr. Potter's remarks by urging the men to "sell" their problems to the legislators.

Following the formal dissolution of the parent association on Wednesday morning, separate meetings were held Wednesday afternoon by the two organizations. Officers for the ensuing year were elected and general business and finance matters considered.

Officers for the Michigan Highway Transportation Association (Bus); G. P. McCullum, Detroit, president; R. Wolf, Coldwater, vice-president; W. E. Taylor, Owosso, treasurer; H. H. Hardy, Lansing, secretary.

For the new organization, the Michigan Commercial Haulers' Association, the following officers were elected; Frank Schmidt, Detroit, president; E. M. Radcliffe, Grand Rapids, first vice-president; H. V. Wood, second vice-president; S. U. Blake, secretary, and A. Beebe, Jackson, treasurer.

# News of the Road

From wherever the bus runs, it brought together the important events, here presented to show the movements of the day.



## Prize Bus Crews Given Airplane Trip

**Detroit Motor Bus Employees Win  
Vacation with Pay for Perfect Record  
—Thirty-six Men Win Prize**

"READY? Let's go!" shouted Detroit's twenty-two prize bus drivers and conductors as they boarded hydroplanes for Cleveland on a three-day vacation with pay recently. They were off for a well-earned holiday as the guests of the Detroit Motor Bus Company, and were the winners of that company's "perfect record" contest whereby it granted vacations and rewards to all men who had perfect or nearly perfect records for a certain period.

The plan as originally announced provided that all drivers and conductors who should maintain perfect records for the duration of the contest, which lasted approximately ten weeks, should be given three days vacation with pay and a trip to Cleveland on one of the hydroplanes of the Aeromarine Airways, Inc., with all expenses paid. As it actually worked out, thirty-six men qualified for the trip, for only twenty-two of whom reservations could be secured. The men therefore drew lots to see who should make the trip and who should accept the alternative proposi-

selves as they saw fit during their vacation.

In addition to the thirty-six who qualified for first honors, four others who had minor charges against their records during the period were given second place, with two days vacation at

home and pay, but without a vacation operation.

While no definite announcement to such effect has been made, it is expected that rewarding exceptional service will hereafter be a part of the permanent policy of the company.

## Electric Railways Extend Bus Systems

**Twenty-six Companies Announce Installations and Extensions—Activity Equally  
Distributed to All Parts of the Country—Buses Used  
in Lieu of Laying Additional Trackage**

**T**WENTY-SIX electric railways have announced installations or extensions of bus service during November. Developments in this field of bus transportation, briefly summarized, are as follows:

The Pacific Electric Railway, operating in southern California, has installed a complete bus service for the city of Glendale, near Los Angeles. Three separate routes are in operation. They are arranged so as to traverse all sections of the outlying districts.

A 6-cent cash fare is charged with the option of purchasing ten tickets for 50 cents, and transfers are interchangeable between electric cars and buses within the 6-cent fare limits. The defined 6-cent fare limits are placed at Burchett Street on the north, San Fer-

points within the 6-cent limit, except that the southern limit will be Cypress Avenue and Brand Boulevard.

The Pacific Electric has previously been operating one bus line in the city of Glendale, and the route of this line has been enlarged so as to cover a greater expanse of territory. With the two additional lines the outlying districts of Glendale will be adequately served. Six of the latest type Pacific Electric buses, seating twenty-five passengers, have been engaged for the new service. Pending a tryout of schedules a twenty-minute to half-hour service will be effective.

The Pacific Electric has also enlarged its service in Pasadena.

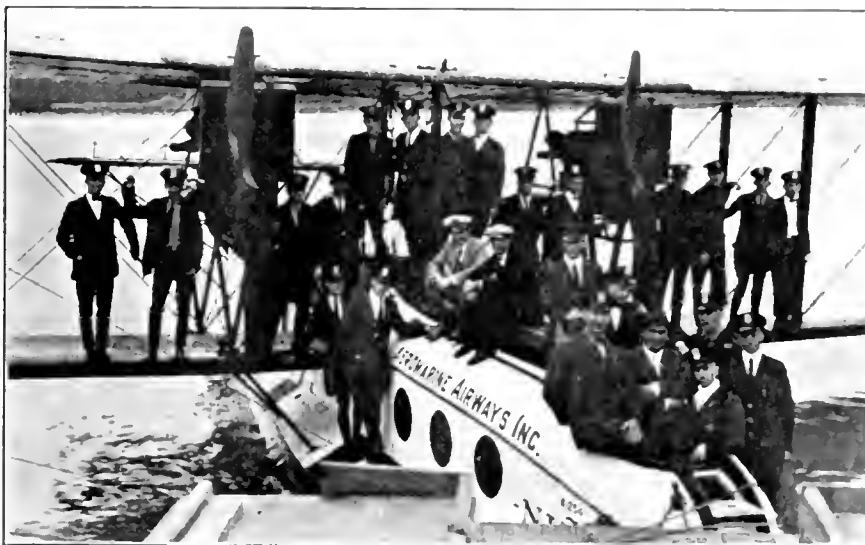
The San Francisco Oakland Terminal Railways has mapped out eight routes for bus-line feeders to the trolley lines in outlying districts of Oakland.

A study has also been made of the situation in Alameda, and plans are being worked out to supplement the facilities now in use in that city, particularly in West Alameda and in the Fernside district.

The Portland Railway, Light & Power Company, Portland, Ore., plans to operate buses over the new Ross Island Bridge to give transportation to sections of southeast Portland not now served by trolley lines. City Commissioner Mann has assured Franklin T. Griffith, president of the railway company, that he can see no objection to such operation.

The Wichita Railroad & Light Company, Wichita, Kan., has under consideration a plan for supplementing its electric railway lines with buses. No definite announcement as to the proposed operation has been forthcoming from officials of the company, but they are known to be considering bus service, especially for the district traversed by Central Avenue, from Main Street to College Hill.

The Fort Scott & Nevada Light, Heat, Water & Power Company, Nevada, Mo., has filed a petition with the



Twenty-two prize drivers and conductors—Winners of Detroit contest

tion of three days vacation at home with full pay, plus \$20 spending money. The twenty-two who won the trip of course had "the time of their lives," while the fourteen others amused them-

nando Road on the south, Broadway and Verdugo Road on the east and San Fernando Road on the west. A fare of 10 cents will apply to and from points north of Burchett Street to

State Public Service Commission to obtain authority to abandon the street railway system in the city of Nevada. In lieu of trolley service the company proposes to establish a complete bus system and has agreed to charge the same fare as is now charged for transportation over the street railway lines.

The *Interstate Public Service Company, Indianapolis, Ind.*, proposes to purchase a number of buses for use in establishing feeder connections. Some of them, it is understood, are considered for use in Jeffersonville, Ind., where the company is considering abandonment of its street car tracks, with the City Council's permission.

A half-hour service between Franklin and Indianapolis is also planned, although this detail has not yet been worked out.

The *Indianapolis & Cincinnati Traction Railway, Waterloo, Iowa*, won its nounces the extension of interurban traction facilities in the installation of bus service between Versailles, Osgood and Greensburg. A schedule has been worked out which will afford a through trip from Indianapolis to Osgood and Versailles in three hours.

The *Arkansas Central Power Company, Little Rock, Ark.*, has extended bus operation in that city. A bus line from the end of the East Fourteenth Street car line to Bruce's Mills, a distance of 1 mile, has been started. Persons desiring to transfer from street car to bus, or from bus to street car, pay fare at the starting point and transfer free at the junction of the two lines.

The *Waterloo-Cedar Falls & Northern Railway, Waterloo, Iowa*, won its case before the State Board of Railroad Commissioners recently when the commission voted to grant the railway's application to operate a bus line between Waterloo and Cedar Falls. No details of the proposed intercity operation has yet been announced.

The *Springfield (Ohio) Street Railways* has started an auxiliary bus line in the Melrose addition to Springfield, the route covering approximately one-half mile. The bus line is the first to operate in the city since the enactment of a drastic regulatory ordinance about three years ago, the act being adopted at the instance of the street railway and preventing any bus lines from operating on streets in which there are car tracks.

One twenty-five passenger bus is being used at present. The bus operates as an extension of the regular car lines, and transfers are given and accepted between the bus and street car lines at the regular fare of 7 cents.

The bus line was inaugurated when residents of the addition demanded car service under terms of the car company's franchise. Financial conditions, according to the latter, are said to have prevented this extension, but it was agreed to establish bus service, which was acceptable to the residents.

The *Community Traction Company, Toledo, Ohio*, is to engage in bus trans-

## Here's a New One!

**S**LEEPING car buses are to be operated by the Towns Bus Line between Staunton, Winchester and Roanoke, Va., as soon as the new highway between the three cities is completed. The seats in the bus will be so constructed that they can be transformed into berths similar to those in Pullman railroad sleeping cars. The company proposes to furnish all-night bus service in Pennsylvania, Maryland and Virginia and to extend its lines as occasion requires.

portation as an integral part of its system in Toledo. The City Council has passed the necessary ordinance which provides for the purchase of two modern buses for use on the Oak Street extension to replace two machines now being operated in conjunction with the traction system, but on a rental basis. A third bus is being rented and operated on South Erie Street. It is expected that it will be replaced by a company-owned bus.

The *Pennsylvania-Ohio Electric Company, Youngstown, Ohio*, which operates the coach service between Youngstown and Warren on the west and between Youngstown and Sharon on the east, has taken over the direction of operation of the Akron-Youngstown Bus Company.

The *Buffalo & Lake Erie Traction Company, Erie, Pa.*, will establish a belt-line bus system for residents of the southwestern section of Erie on Cherry Street where the bus line would intersect the electric railway lines at Fourth, Eighth, Twelfth, Eighteenth and Twenty-sixth Streets and provide a cross-town system, north and south for the west side.

The *Wheeling Public Service Company, Wheeling, W. Va.*, has applied to the State Road Commission for a permit to operate buses in Wheeling from Elm Grove to West Alexander.

Application for a permit to operate buses from West Alexander to Washington, and then finally into Pittsburgh, Pa., will be made before the Public Service Commission of Pennsylvania.

The *Virginia Railway & Power Company, Richmond, Va.*, will establish a trackless-trolley non-transfer service in Petersburg, Va., from the Walnut Hill section to the center of the city. Two new vehicles have been acquired for this purpose.

The *Washington Railway & Electric Company, Washington, D. C.*, announces that operation of the bus line from Seventeenth and Pennsylvania Avenue through Randle Highlands, which was authorized by the Public Utilities Commission, was begun on Dec. 1. Buses are run over the Pennsylvania Avenue Bridge to Minnesota Avenue, to Naylor Road, to Twenty-fifth Street, to Pennsylvania Avenue

and return on that street to Seventeenth Street S. E. There will be free transfers to and from the street cars.

The company has also been granted a permit to operate buses to the Lincoln Memorial. This service will be an extension of the present lines operated into the vicinity of Potomac Park.

The *Chester County Traction Company, Chester, Pa.*, purchaser of the West Chester, Kennett & Wilmington Electric Railway, has also purchased the B. & D. Bus Company, according to Charles B. Cooke, Jr., of Philadelphia, president of the traction company.

"It is our purpose, in buying the B & D. bus line," Mr. Cooke explained, "to give the people of that whole section immediate connection with the heart of Wilmington, Del., the buses being operated in connection with the trolley line between Kennett Square and West Grove.

The *Beaver Valley Traction Company, New Brighton, Pa.*, has applied to the State Public Service Commission for the right to operate buses from the end of its line in Leetsdale to the end of the Pittsburgh Street Railway Company's line near Sewickley. The company is making a similar petition for a permit to operate buses from Rochester to Woodlawn.

The *Altoona & Logan Valley Electric Railway, Altoona Pa.*, will serve the residents of the Juniata Gap district of the city with buses soon. The Juniata Gap section is one of the largest suburban areas surrounding Altoona.

The *York Railways, York, Pa.*, will operate a bus line between Red Lion and Stewartstown, Pa., the necessary permit having been issued by the State Public Service Commission. The company is also planning the purchase of the York Turnpike Bus Line from Walter H. Melhorn.

The *Atlantic Coast Electric Railway*, operating along the New Jersey shore, plans the installation of a bus system for the coast cities. The tentative plan for the system indicates that the activities will be on a larger scale than anything ever attempted on the North Jersey shore. While the proposed routes are only tentative and were not made public, it is understood the company plans four intercity systems.

The *Middlesex & Boston Street Railway, Newtonville, Mass.*, has applied to the State Utilities Commission for permission to operate buses in Arlington, Billerica, Bedford, Concord, Natick, Cohituate, Wayland and Saxonville, Mass. The company desires to abandon the electric railway lines in these towns.

The *Hartford & Springfield Street Railway*, operating in Massachusetts and Connecticut, has given notice through Manager J. T. Hambleton of its purpose to establish a bus line between Springfield, Mass., and Suffield, Conn., thus enabling street car service to be discontinued on the upper end of the company's west side line. It is

understood the plan includes bus service over the entire west side route eventually. This company links up the Springfield Street Railway and Connecticut Company systems. It has been operating for some time under a receiver, and Manager Hambleton tells the Springfield Transportation Board that its earnings decreased 30 per cent in the last year. His application for a bus franchise is unopposed in Springfield, and applications for permits have been filed with the towns on the west side of the Connecticut.

*The Medway & Dedham Street Railway, Milford, Mass., and the New Bedford & Onset Street Railway* have applied for permits to operate buses in their respective territories.

*The Jacksonville Traction Company, Jacksonville, Fla.,* will introduce buses to supplement its service early in January, 1924, according to an official announcement made by the company. Buses will replace the present Oak Street trolley line and will be extended north to take in the municipal docks and the electric light plant on Talleyrand Avenue. The regular 7-cent fare now prevailing on street cars will be charged and free transfers issued. Four buses will be used on the line, which is  $4\frac{1}{2}$  miles in length.

### Buses for Illinois City

Buses are to take the place of the electric railway system in Streator, Ill. At a recent meeting of the City Council, the Public Service Company of Northern Illinois was granted permission to cease railway operation and tear up the tracks of the Illinois Light & Traction Company. As stipulated in the agreement, the Public Service Company guaranteed satisfactory bus service for the next five years. At the same meeting an independent company, known as the Yellow Bus Company, was authorized to take up operation with a view toward supplying the citizens with adequate bus service.

### May Vote on Bus in Oakland

The question of whether the City of Oakland, Cal., shall go extensively into municipal bus operation will be submitted to voters of that city at a special election if an initiative petition that was being circulated for signatures late in November is successful. The petition was backed by the city administration and it was believed that the 5,000 signatures required would be secured. The wording of the petition was as follows: "We, the undersigned residents and registered voters in the City of Oakland hereby petition the City Council to call a special bond issue election to raise \$1,000,000 for the purpose of purchasing automobile stages to establish a municipal bus system."

So much activity of a political nature has attended the showing of interest in a municipal bus line in Oakland that thus far the plan does not seem to have been taken very seriously by the people as a whole.

## British Bus News

### Trackless Trolley Operation Planned in Ashton-under-Lyne — London Omnibus Added 2,153 Drivers, 2,217 Conductors in Last Ten Months

**P**ROSPECTS of the adoption of trackless trolley vehicles are also extending in England. Ashton-under-Lyne Corporation proposes to abolish a tramway which runs between that borough and Oldham and to substitute trolley buses. St. Helen's Town Council has appointed a deputation to visit various towns where trackless trolley cars are in use. E. C. Ransome, chairman of the Ipswich tramways committee, has expressed the hope that an experiment now going on with railless cars will be successful, that it will reduce running costs, offer a better service, and enable fares to be reduced. He hoped that the experiment would result in the replacing of the tramways by trolley buses

and avoid the distraction of traffic in the narrow streets. At Darlington, where the Town Council is faced with the problem of replacing the whole of the tramway track at the near future, J. R. P. Linn, manager, has presented a report which says that the replacing of the tracks will cost from £20,000 to £120,000. He advocates the adoption of trolley traction. The cost of twenty trolley cars would be £45,000.

### CABINET OPERATORS ORGANIZE

There are a ready-made Great Britain number of local bus and trolley companies, but a new one, formed at Cardiff under the name of the Motor Operators' Proprietors' Association, and at being representative of the whole country and is attracting considerable interest here. The object are protection of the members' interests and to assist in trading. Membership is confined to proprietors owning at least two cars, and is intended to maintain daily services for the public

## Tabular Presentation of Recent Bus Developments

Name	Address	Lines Started
Jesse Bussey	Little Rock, Ark.	Little Rock, Ark.
Hall & Son	Knox, Ill.	Knox, Ill.
Hall & Winstead	Birmingham, Ala.	Birmingham, Ala.
F. S. & D. M. Dalton	Albany, N. Y.	Albany, N. Y.
Southern Illinois Bus Line	Benton, Ill.	Benton, Ill.
C. J. McDonald	El Reno, Okla.	El Reno, Okla.
Natchez Brookhaven Bus Line	Natchez, Miss.	Natchez, Miss.
Leo Meigs	Detroit, Mich.	Detroit, Mich.
Cadiz Bus Line	Seaford, Del.	Seaford, Del.
Lehigh, Weston & Sons	Bessemer, Ala.	Bessemer, Ala.
F. J. La Rue	Indianapolis, Ind.	Indianapolis, Ind.
Goldshore Kingston Bus Line	Goldboro, N. C.	Goldboro, N. C.
Statesville Winston-Salem Bus Line	Statesville, N. C.	Statesville, N. C.
J. W. Summers	Monroe, Ark.	Monroe, Ark.
J. Brown	Soldier, Miss.	Soldier, Miss.
H. D. Brand	Gadsden, Ala.	Gadsden, Ala.
Bartonville Motor Bus Co.	Bartonville, Ill.	Bartonville, Ill.
Cuyuna Transportation Co.	Arkum, Mich.	Arkum, Mich.
Ashland-Russell Bus Line	Ashland, Ky.	Ashland, Ky.
Salt Creek Transportation Co.	Salt Creek, Wyo.	Salt Creek, Wyo.

Name	Address	Permits Granted
Arrow Stage Line	Price, Utah	Price, Utah
Maurice River Transportation Co.	Perth, Ariz.	Perth, Ariz.
John Coons	Guthrie, N. Y.	Guthrie, N. Y.
Elmer I. Way	Fresno, Cal.	Fresno, Cal.
J. P. Hildreth	Cloverdale, Cal.	Cloverdale, Cal.
Pickwick Stages, Inc.	San Diego, Cal.	San Diego, Cal.
A. Sutherland	San Diego, Cal.	San Diego, Cal.
Aranson & Boswell	Serrano, Cal.	Serrano, Cal.
Perry J. White	Bishop, Cal.	Bishop, Cal.
Peerless Stages, Inc.	San Jose, Cal.	San Jose, Cal.
Baltes G. Walker	Andrew, Cal.	Andrew, Cal.
Coast Line Stages	Fort Bragg, Cal.	Fort Bragg, Cal.
Clyde Terry	Salt Lake City, Utah	Salt Lake City, Utah
Moore's Interstate Motor Lines	High Point, N. C.	High Point, N. C.
David Drake	Orleans, La.	Orleans, La.
J. A. Towns	Harrisburg, Pa.	Harrisburg, Pa.
Cismont Motor Bus & Supply Co.	Cismont, Va.	Cismont, Va.
Attravan & Lupton	Meriden, W. Va.	Meriden, W. Va.
Caravantes & Busle	Wheeling, W. Va.	Wheeling, W. Va.
Joseph Casey	Charleston, W. Va.	Charleston, W. Va.
Andrew J. Nassauer	Charleston, W. Va.	Charleston, W. Va.
Edgar M. Scautt	Albany, N. Y.	Albany, N. Y.
C. A. Harris	Albany, N. Y.	Albany, N. Y.
Mountain Bus Co., Inc.	Mountain, N. Y.	Mountain, N. Y.
Elmer N. Carwin	New York, N. Y.	New York, N. Y.
Harry A. Lippert	Hartford, Conn.	Hartford, Conn.
Lawrence A. Walters	Camden, N. J.	Camden, N. J.
Arthur I. Lasswell	Philly, Pa.	Philly, Pa.
Hudson Transit Corp.	Philly, Pa.	Philly, Pa.
J. I. Brown	Philly, Pa.	Philly, Pa.
Fred O. Mullen	Philly, Pa.	Philly, Pa.
New Jersey Transportation Co.	Newark, N. J.	Newark, N. J.
Kankakee, John & Pontiac Bus Line	Kankakee, Ill.	Kankakee, Ill.

Name	Address	Incorporations
Cross Bay Bus Co., Inc.	309 P. O. 142 St. Joseph, Mo.	St. Joseph, Mo.
Brown Bus Co., Inc.	246 Olive St. Bronx, N. Y.	Bronx, N. Y.
Virginia Beach Bus Line	Norfolk, Va.	Norfolk, Va.
Logan County Bus Co.	Princeton, W. Va.	Princeton, W. Va.
Reynolds Bros.	Streator, Ill.	Streator, Ill.
Edgar County Motor Bus Co.	Peoria, Ill.	Peoria, Ill.
Kankakee-Gilman Motor Bus Co.	Kankakee, Ill.	Kankakee, Ill.
Green Bay-Marquette Bus Co.	Green Bay, Wis.	Green Bay, Wis.
Hawthorne Bus Association	Petersburg, N. J.	Petersburg, N. J.

time-tables and scales of fares. Thus the owners of what in America are called jitneys are kept out.

#### NEW PARLIAMENTARY TRANSPORT SECRETARY

Lieut.-Col. J. T. C. Moore-Brabazon has been appointed Parliamentary Secretary to the Ministry of Transport in succession to Colonel Wilfrid Ashley, who has been appointed Under Secretary for War. Colonel Brabazon has been a member of Parliament for only a few years and is perhaps best known as one of the most skilful and successful airplane pilots in the earlier days of flying.

An example of the great reliability of engines for buses made by the Associated Equipment Company, Walthamstow, London, is given by some figures issued by Edinburgh Corporation tramway department, which runs a large fleet of buses in addition to tramways. The engines of three of these buses have run the vehicles the following distances without being taken down: No. 1, 45,342 miles; No. 2, 32,316 miles; and No. 3, 55,218 miles.

#### LONDON OMNIBUS ADDS TO STAFF

In the ten months from Jan. 1 till early in November 2,153 additional drivers and 2,217 conductors were engaged for the operation of the London General Omnibus Company's buses. This represents an increase of 38 per cent in the bus staff. There are now 7,943 drivers and 7,961 conductors in the company's service.

#### NEW GLASGOW-EDINBURGH HIGHWAY

After prolonged negotiations regarding the allocation of cost between local authorities concerned, an agreement has been reached for the construction of a great new highway between Glasgow and Edinburgh. The length is about 40 miles and the estimated cost is £1,900,000. Of this sum the government will contribute 75 per cent. To make up the remainder Glasgow will pay £275,000, Edinburgh £100,000, and Lanarkshire £100,000. There will also be a loop extension from near Edinburgh to Leith, to cost £260,000, half of which will be borne by the government and half by Edinburgh.

The work is to be begun as soon as possible so as to provide occupation for a large number of the unemployed. The new highway will consist partly of new roads and partly of existing roads which are to be widened and improved. There will be a width of 100 ft. between fences, but for the present it is proposed that the width of the carriage-way should be 30 ft., but should be so constructed that it will be easy in the future to widen it whenever it is found desirable.

#### Merchants Back San Leandro Line.

Establishment of a crosstown bus service in San Leandro, Cal., was recently completed by the Chamber of Commerce of that city. Desiring to insure ample transportation facilities within San Leandro, merchants of the city have

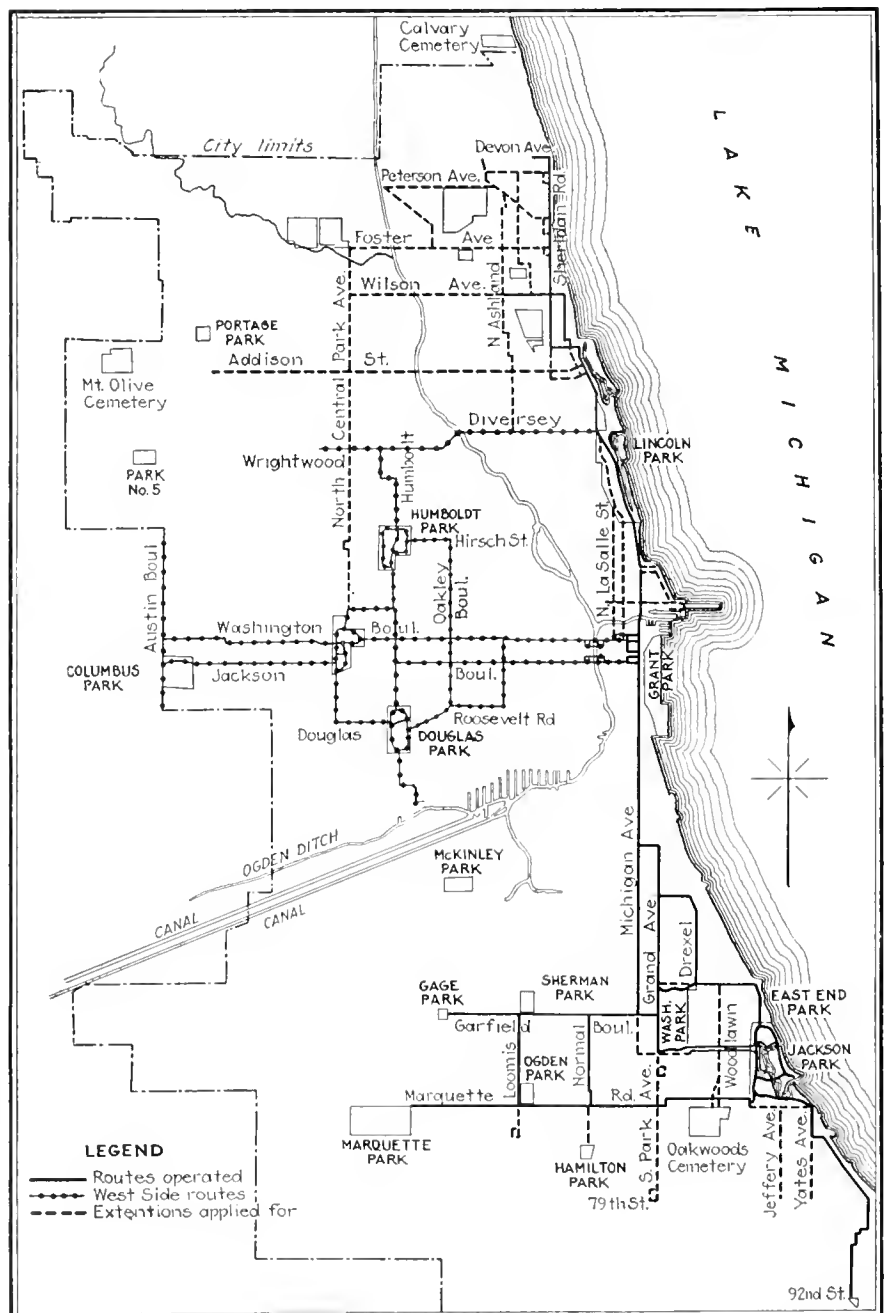
underwritten the purchase and operation of one bus, under direction of the Chamber of Commerce. The fare is 5 cents. With the efficiency of the bus line proved, the service will be extended and more buses will be added, according to officials of the Chamber. Alameda and Hayward, neighboring communities of San Leandro, have also indicated their purpose of establishing a similar service.

**Bus Service Replaces Defunct Railway.**—With the closing down of the Pennsylvania-New Jersey Railway between Doylestown and Bristol, N. J., on Nov. 1, the bus line running from Lam-

bertville and New Hope to Doylestown and Hatboro was extended to serve the former electric railway towns.

**Camden Operators Rebuked for Traffic Offense.**—Camden, N. J., bus operators recently aroused the ire of Robert S. Burns, city transportation inspector, by adopting the practice of allowing passengers to ride on the steps of their vehicles. Mr. Burns, noticing several buses with passengers hanging precariously on the steps, conducted a thorough examination of all the buses operating in the city. He later warned the bus owners that they were liable to a fine of \$50 for each offence of this nature.

#### Chicago Coach Plans New Lines



**EXTENSIONS** of bus routes in Chicago are planned by the Chicago Motor Coach Company. These depend, of course, on the action of the municipal authorities in granting the necessary permits for extended operation. The location of proposed routes are shown in the accompanying map.





## Financial Section

## Bus Line in Baltimore Shows Surplus

United Railways & Electric Company  
Subsidiary Reports Operating Income  
of \$25,736 for First Six Months, 1923

OF INTEREST to bus operators everywhere is the financial statement of the Baltimore Transit Company, subsidiary of the United Railways & Electric Company, operating in Baltimore, Md., and vicinity.

The company runs four bus lines and one trackless trolley line. The combined length of all five routes is about 15 miles. Equipment consists of thirty single-deck, four double-deck buses and three trackless trolleys. The minimum fare is 7 cents. On two lines, the Charles Street and Mount Royal Avenue, a 10-cent fare is charged with no transfers and no standing passengers.

With these conditions in mind it is interesting to learn that the total income of the lines for the first six months of 1923 was \$162,434. Operating expenses came to \$136,698, leaving an operating income of \$25,736. Complete figures are given below.

The Charles Street line has been placed on a profitable basis, according to these figures. During the year 1921

a deficit of \$8,495 was reported in 1921. The operating income for the first six months of 1922 shows a net income of \$12,506.

Double deck operation shows a profit income of \$12,187; single deck, \$9,121. The Randolph town tracks, under the report, a deficit of \$6,099. It is operated in a comparatively sparsely settled district.

The state men's tax for the single-deck equipment, except trolley and trolleys, is  $\frac{1}{2}$  cent per cent mile, and for the double-deck bus and trolley trolleys, 1 cent per cent mile, payable annually in advance but subject to a

$$\frac{a(t)}{a(t_0)} = 1 + \frac{u(t) - u(t_0)}{u(t_0)} = 1 + \frac{u(t) - u(t_0)}{u(t_0)} \frac{1}{1 - \frac{u(t_0)}{u(t_0)}} \quad \text{for } t \geq t_0$$

A significant finding of the present study is that the proportion of the total variance explained by the first two principal components is 60.9%, which is much higher than the 40% reported by other studies. However, the large proportion of variance explained by the first two components is due to the high correlation between the two variables, which can be changed without necessarily affecting the meaning of the variables. In fact, the two variables are identical, and the first component is the average of the two variables.

## California Railroad Commission Issues Bus Report

Motor Carriers in that State Last Year Showed a Total Investment of \$12,317,089  
 —Passenger Lines Did a Gross Business of \$15,549,349 and Used 1,616  
 Motor Buses in Transporting 21,221,928 Passengers

THE annual report of the California Railroad Commission, which is to be officially issued in the near future, contains commentary as well as figures on the rapid growth of the motor transportation industry in that state. Although some figures are given that bring the record up to June 30, 1923, for the most part the data cover the calendar year of 1922. Abstracts of the report made before it went to print by a member of BUS TRANSPORTATION staff in San Francisco are given here.

During the year 1960-1961, the report there has been a substantial increase in the general level of transportation of large amounts of material and local services transferred from operating units to outside companies, wider local and regional territory. Others sought on a regional level, either through the purchase of existing lines, or by application to the Government for new routes based on the demand of that public convenience and, finally, required the additional transportation service.

This has been accomplished by a continuous improvement in the service. To quote the exact language of the report: "Today the traveler patronizing the auto stage finds every convenience and comfort; cushioned car, roomy to a degree considered impossible in the early days of motor transportation, well ventilated and lighted, make public motor travel a pleasure. Traversing the length and breadth of California, motor stages are giving to residents of the state a real public service, and to the tourist an opportunity to view all the wonders between the Oregon line and Mexico. At the same time motor stages have added to the transportation of the country a service that is in reality a convenience and a necessity."

On June 30, 1923, there were 713\* automotive carriers in the State of California operating under the jurisdiction of the Railroad Commission and classified as follows:

Condensed Cumulative Income Statement, Jan. 1 to June 30, 1923,  
Baltimore Transit Company

	Charles	Mount Royal	Alameda	Total Single Deck	Double Deck	Total Both Operations	Randallstown	Total All Operations
<i>Income</i>	\$64,803	\$35,020	\$5,529	\$105,383	\$44,280	\$149,663	\$12,771	\$162,434
<i>Operating Expenses</i>								
Way and structures							1,324	1,324
Equipment	16,472	15,187	2,335	33,993	7,347	41,330	6,364	47,694
Power							1,850	1,850
Conducting transportation	25,202	23,234	3,495	52,331	16,031	68,363	3,904	72,266
General and miscellaneous	4,915	4,684	821	10,422	2,171	12,592	970	13,563
Total operating expenses	46,589	43,105	7,051	96,746	25,539	122,285	14,412	136,698
Operating income or deficit	18,214	8,085	1,492	8,637	18,741	27,378	1,522	25,736
<i>Taxes</i>	3,315	3,022	490	6,828	3,436	12,264	2,202	14,466
Income or deficit (after taxes)	14,899	11,107	1,982	1,809	13,305	15,114	1,522	11,270
<i>Fixed charges</i>	2,393	2,185	298	4,875	1,118	5,993	2,255	8,248
Income or deficit (Trans to P. & L.)	12,506	11,222	2,280	3,065	12,187	9,121	6,999	3,022
<i>Notes indicate deficit</i>								

## SUMMARY

	Charles Royal	Mount Alameda	Single Deck	Double Deck	Total Bus Operations	Ratio to Average
Revenue miles operated	146,119	139,632	24,245	304,996	374,302	155.10
Total miles operated	152,036	144,053	25,260	321,349	387,763	167.28
Transfer passengers			63,124			
Revenue passengers	634,089	336,818	55,320	1,026,227	437,709	105.64
Revenue passengers rev. bus-mile	4.3	2.4	2.3	3.3	6.81	1.70
Bus-hours operated	21,505	18,521	3,054	43,080	52,347	128.2
Average speed (including layovers)						
per bus-hour, cents	6.79	7.5	7.9	7.2	6.9	10.4
Earnings per rev.-mile, cents	44.3	25.1	22.9	34.0	68.9	23.2
Cost per rev.-mile operated, cents	31.9	30.9	29.9	31.2	32.7	26.1
Way and structures, cents						2.4
Equipment, cents	11.3	10.9	9.0	11.0	11.4	11.5
Power, cents						3.3
Conducting transport, cents	17.2	16.6	16	16.8	24.9	18.3
General and miscellaneous, cents	3.4	3.4	3.4	3.4	3.4	1.8
Taxes, cents	2.3	2.2	2.0	2.2	3.3	4.0
Fixed charges, cents	1.6	1.6	1.0	1.5	1.6	4.1
Total operating costs, taxes and charges per rev.-mile, cents	35.8	34.7	32.3	34.9	37.6	34.2

Passeggeri	46
Passeggeri "Gruppi"	10
Passeggeri "Lampi"	8
Passeggeri "Società"	2
Fractions	24
L'Espresso	7
L'Espresso	18
L'Espresso "Gruppi"	19
Speciali "Gruppi"	4
Soldati "Gruppi"	4

\*Note: Not all of the above are available in every size. For more information, call 1-800-368-2262. For a complete list of products, visit [www.thermo.com](http://www.thermo.com).

Stage and truck lines are divided into two classes by the accounting system used by the California Commission. All operating units having a gross income of \$20,000 or more are listed under Class A and are required to file reports under headings prescribed by the commission in its "Uniform Classification of Accounts," just as are other large utilities of the state. Report requirements from the lesser companies, covering much the same itemizations, are less rigidly enforced.

#### CLASS "A" OPERATIONS

Reports from 140 Class A companies covering financial operations for the calendar year 1922 show a total operating revenue of \$12,596,309, with a total operating expense of \$11,831,754, yielding a net operating revenue of \$764,555. By additions from other sources (non-operating income) totaling \$1,702,119, the gross income of these companies is increased to \$2,466,674. Non-operating expenses which include interest, federal income taxes and expenses of other operation total \$1,770,266. The profit for the year of all these companies amounted to \$696,408. During the year the dividend paid by all Class A companies reporting totaled \$157,842.

The main sources of revenue of the Class A carriers were as follows:

Passenger revenue	\$7,770,054
Freight revenue	3,179,873
Express revenue	960,574
Baggage revenue	101,819
Mail revenue	201,402
Other transp. revenue	138,842
Total	\$12,352,564

Totals of the chief items of expense reported by the Class A companies are classified as follows:

Fuel	\$1,150,758
Lubricants and other supplies	219,712
Damages to freight and baggage	43,874
Injuries and personal damage claims	185,316
Salaries and expenses of general officers	422,498
Salaries and expenses of general office clerks	341,665
Drivers of passenger cars (salaries)	1,316,191
Drivers of freight cars (salaries)	745,643
Drivers of express, baggage and mail cars (salaries)	262,429
Superintendence of transportation	189,987
Station employees	423,716
Garage, labor and incidental expenses	382,274
Total	\$5,684,063

Other statistics for Class A operations for the calendar year 1922 were as follows:

Passengers carried	18,721,485
Freight transported (tons)	444,943
Passenger car-mileage	29,723,980
Freight car-mileage	3,754,510
Total number passenger cars used	975
Total number freight cars used	625
Trailers and other rolling stock (number of pieces)	291

As a whole the operations of all the large companies were profitable, or at least showed an excess of operating income over operating expense.

A tabulation of figures for some of the larger Class A companies, according to their reports to the commission covering operations in 1922 will be found in the accompanying table.

#### CLASS "B" OPERATIONS

The 573 Class B or small companies, comprising the motor stage and truck lines whose revenues did not exceed

#### Passenger Carriers

Number of Carrier	Revenue	Operating Expenses	Number of Cars	Passengers Carried
Vallejo-Benicia Stage Line	\$28,416	\$26,829	8	159,715
Bay Cities Transit Company	180,487	165,174	22	3,000,000
B. & H. Transportation Company	264,542	257,834	37	5,226,558
Crown Stages	362,023	341,297	42	1,009,399
California Transit Company	843,871	734,580	69	771,428
Dillingham Transportation Company	83,865	73,669	14	198,324
Golden Eagle Barker Stage	50,134	42,272	8	74,625
McVey Stage Lines	48,357	38,774	7	72,328
*Motor Transit Company	1,461,436	1,469,667	94	2,139,449
Original Stage Line	136,820	123,415	14	445,748
Peninsula Rapid Transit Company	453,894	428,518	28	No record
Pickwick Stages, Inc., Southern Division	266,748	266,584	19	143,542
Pickwick Stages, Inc., Northern Division	528,643	518,075	44	160,355
Pacific Auto Stages	163,363	151,127	10	203,251
Pierce-Arrow Stage	126,094	93,562	21	50,766
San Jose-Santa Cruz Stage	37,101	30,464	6	29,642
Santa Rosa, Petaluma and Sausalito Auto Stage Company	150,653	121,472	13	130,879
Vallejo Bus Company	69,001	68,529	8	690,542
United Stages, Inc.	129,447	125,203	10	161,497
Valley Transit Company	417,680	374,801	39	388,369
Auto Transit Company	39,782	36,068	6	12,278
Autherlands Tia Juana St.	226,606	224,616	42	461,630

\* Income from other sources \$184,822.

\$20,000 in the calendar year, report a total investment in cars and shop equipment of \$1,922,681. The total revenue of these companies for the year 1922 amounted to \$2,953,040. The sources were as follows:

Passenger	\$1,147,508
Freight	1,274,535
Mail	261,924
Express	148,711
Other sources	120,359

The expenses of these lines totaled \$2,490,970, giving a net revenue of \$462,069. The chief items of expense of the small companies were as follows:

Labor	\$703,503
Gas and oil	423,655
Repairs	417,099
Depreciation	289,341
Salaries (officials and clerks), office expense	227,440

The small carriers in 1922 transported 2,500,443 passengers and 220,483 tons of freight. In these operations 641 passenger cars were used, 334 freight cars and forty-four other vehicles, such as trailers, wagons, etc.

Recapitulation of the reports of the Class A and so-called small companies shows that revenues from purely motor operations totaled \$15,549,349. The operating expenses of all companies totaled \$14,322,725, leaving a net revenue of \$1,226,624.

Of the Class B carriers eighty-six operated at a loss, as did thirty-four of the Class A carriers. The investment in physical properties represented in the operations of the 713 automotive carriers in the state, according to their financial reports, shows a total of \$12,317,089, divided as follows:

CLASS A	
Plant and equipment	\$9,280,880
Other property (non-operating)	267,319
Materials and supplies	427,139
	9,975,340
CLASS B	
Value of cars	\$1,865,743
Shop equipment and lands	56,937
Materials and supplies	32,725
	386,342
	2,341,749
Total	\$12,317,089

The equipment used by all companies, a recapitulation of their reports shows, totaled 1,616 passenger cars, 959 freight

cars and 335 other vehicles, such as trailers and wagons. The number of passengers transported during the year by both large and small companies reached a grand total of 21,221,928.

#### Trackless Trolley Costs

Annual Report of English Company Gives Comparison with the Electric Trams

INTERESTING figures on the cost of trackless trolley operation is contained in the annual report of the Bradford Corporation Tramways, operating in Bradford, England, a city of 300,000 population.

Five routes are operated with a fleet of twenty buses. The length of the routes is as follows: 2.7, 2.1, 1.6, 1.6 and 1.3 miles. The average fare per mile, exclusive of workmen's rates, was 1.007d. or 2 cents, based on a fare of 1d. (2 cents), 1½d. (3 cents), 3d. (6 cents) and 4½d. (9 cents).

The gross earnings per bus-mile were 12.99d. or 26 cents. Operating expenses of 16.23d. or 32 cents included power at 3.8 cents (based on 1.032 kw.-hr. per bus-mile and 3 cents per kw.-hr.), wages at 11.3 cents, bus upkeep at 8 cents, overhead maintenance at 0.54 cents and building and tools at 0.09 cents.

There were 392,192 bus-miles run during the year at 7.6 m.p.h. to get £21,230 from 3,243,348 passengers. The earnings per mile of route were £2,238.

In comparison, the tramcars ran 6,121,622 car-miles at 7.3 miles per hour. This low speed is due to severe grades. Passengers carried were 82,046,210. Earnings per mile of track route were £11,018, or nearly five times that in the trackless territory. Gross earnings per car-mile were 25.48d. (50.96 cents) and operating expenses (double-deck cars) were 18.17d. (36.3 cents). The average fare per mile, exclusive of workmen's rates, was 0.98d. (1.8 cents) based on a scale of 1.5d. (3 cents), 2½d. (5 cents), 3d. (6 cents), 4d. (8 cents), 4½d. (9 cents) and 6d. (12 cents). The workmen's fare is 1d. minimum.

# Bus Regulation



## Red Ball Lines Granted Permit

Twenty-four-Year-Old Mason City, Iowa, Girl Wins Over Protest of Four Railroads and Two Electric Railways

AMERICA'S "bus queen" has won! Despite the fact that four railroads and two interurban electric railways filed objections to prevent the issuance of a bus line certificate to Miss Helen Schultz of Mason City, Iowa, proprietor of the Red Ball Transportation Company, the State Railroad Commission granted the certificate on Nov. 21, which permits the continued operation of Miss Schultz's extensive system of bus lines throughout the State of Iowa.

Before the certificate is issued, however, she must comply with restrictions

the public convenience," one of the two things required to be shown by the law. The other routes were not contested, having been in good faith operation on April 14, the second of the two requirements for certification under the law. Certificates for the other routes will be issued.

### MAY START LITIGATION

The decision of the board is expected to be the forerunner of a series of lawsuits which may be carried into the United States Supreme Court for a final definition of what constitutes "promotion of the public convenience." The railroads cannot appeal from the decision of the commission. They can only contest the operation of the buses further by seeking an injunction restraining the commission from issuing the certificates of authority or enjoining the operation of the buses.

All three men who make up Iowa's Railroad Commission concurred in the decision to grant the certificates, although Commissioners Lewis and Webster did not arrive in the same way at the conclusion that Miss Schultz's serv-

prophetic. "If we believe that in the undetermined future the present establishment of a bus or truck line will cripple the rail service now provided, then we should find that the motor carrier would not promote the public convenience."

"However, should we may be our mind that there is grave danger of conflict of service by rail when a petition with bus and truck service is manifestly not within our present prognosticate and upon that basis set against a proposed bus or truck line."

Miss Schultz, who is known to the public variously as "the Iowa bus queen" and "the queen of bus land" and who has received much newspaper attention during the progress of her controversy with the railroad, was much gratified by the decision of the commission. In a statement to BUS TRANSPORTATION, Miss Schultz said:

"I am naturally very happy over the outcome of my petition. As to the restriction laid down by the commission, I am very glad they were included. My schedule have always been arranged on a speed basis of 22 to 24 m.p.h. I am also pleased that there are to be no more free passengers when one person receives a passenger's get the notion that they had a free given one, and the first thing we know we have a load of free passengers."

"My bus business is the pride of my life, and I even refuse to amuse myself with exceptionally good drivers who have been with me ever since I first started here in Mason City, and they just seem to go with the buses. They understand their work so well, and they are so courteous to the public, and very capable. I prefer drivers over thirty years old, married, and with at least some degree of garage experience so they understand how to take care of their bus on the road."



America's Bus Queen in one of her own coaches

ordered by the commission on the way in which her buses are driven. She must arrange her schedules so that they will not directly compete with schedules already adopted by competing carriers; her schedules must be made to indicate clearly that the running time shall not exceed the speed limit of 25 m.p.h. fixed in the law; her rates must be the same to all; and no free transportation other than is permitted the railroads may be issued. For violation of any of these provisions the board will revoke the certificate.

Of five motor routes over which the girl's buses are operated, only two were involved in the decision of the railroad commission—routes running from Mason City south to Des Moines and north to Minneapolis. Certification of these routes depended upon the girl's proof to the commission that they will "promote

ice will promote the public convenience. Commissioner Woodruff added to the opinion that rail carriers should treat motor transports as an ally, operating buses to establish feeder traffic. Commissioner Lewis wrote the majority opinion.

The commissioners took the stand that consideration of public convenience is the only one for them to determine in issuing bus licenses, and that it is not synonymous with necessity. They pointed to the fact that in the original bill in the Legislature the words "and necessity" were stricken out by amendment.

### "PUBLIC CONVENIENCE"

"Just what the promotion of public convenience means," the opinion reads, "is not always easy to determine. It has been argued that we should be

## City Wins Bus Ronting Dispute

Intercity Lines Entering Dayton, Ohio, Must Follow the Route Rollings of the Municipal Authorities

BUS operators at Dayton, Ohio, must hereafter follow routes at that city as designated by municipal officials according to a recent decision of the Ohio Public Utilities Commission.

This decision ends a controversy in Dayton of long standing, and of some bitterness. A few months ago the Inter-City Bus Line, entering Dayton disregarded the routes designated by the city, on the ground that under a state ruling they were not compelled to follow them. Municipal authorities, on the other hand, contended that they retained the right, under the state ruling, to specify over what streets buses should run, and the case was carried to the Public Utilities Commission for decision.

In granting an even dozen applications for certificates of necessity and

convenience recently the protests of the city were recognized by the commission. Certificates were granted as follows over routes outside Dayton and within the city as requested by municipal officials:

Dayton-Xenia Motor Bus Company, King Brothers, Lebanon to Dayton, no protest; Red Star Transportation line, Dayton to Sidney; Red Star Transportation line, Springfield to Dayton, grants to F. E. Roof and R. J. West; Red Star Transportation line, Dayton to Eaton, to Richmond; Lewisburg and Dayton Bus, grant to Beam & Miller; Greenville and Dayton, to W. O. Small; Germantown-Dayton Bus Company; Dayton-Xenia Bus line; Osborn and Dayton, grant to Jolly & Yowler; Dayton-Waynesville Bus line.

## Powers of State Body Over Interstate Lines Disputed

**Reo Bus Company Asserts Virginia Commission Cannot Deny Permits to Lines Crossing State Border.**

A CASE of national importance, involving the jurisdiction of the Virginia State Corporation Commission over bus lines engaged in interstate traffic, is now being fought out before the commission, and may not be finally settled until it is carried to the Supreme Court of the United States.

The case is being prosecuted by the Washington-Potomac Railway, an electric line operating between Alexandria, Va., and Washington, D. C., against the Reo Motorbus Line, a competitor. According to the contention of the defendant bus line, the Corporation Commission has no right to deny bus lines in interstate service permits to operate. The brief of the Reo Company acknowledges the authority of the commission in all matters of taxation and regulation. Authorities from Chief Justice John Marshall to the present time are cited to uphold their contention.

The importance of this case lies in the fact that there are a great number of interstate bus lines now operating, especially in the neighborhood of Bristol and Washington. Under an act of the last special session of the Virginia General Assembly the commission was given power to "regulate, supervise, and control" persons, firms and corporations managing motor vehicles as carriers of passengers.

One of the most important powers conferred on the commission under this act is the power to withhold permits from bus lines at its discretion, unless such lines were operating in good faith at the time the regulatory act was passed. If the contention of the Reo company should be upheld, it would considerably restrict these powers.

There is no act of the Interstate Commerce Commission covering such cases, or placing interstate bus traffic under the direct supervision of the federal body. The decision will involve large interests and set an important precedent.

# Personal Notes

## The Skipper and His Twins

Out beyond New London, on the shores of Long Island Sound, they run to seafaring. Sea captains and old salts, mostly retired, are as thick there as automobiles in Fifth Avenue, New York. Ship and boat building is the main occupation and means of livelihood. Through this section, from New London to Westerly, with Groton, Stonington and Noank as ports of call, runs the line of the Groton & Stonington Traction Company.

The skipper of this outfit is W. L. O'Brien, calling himself "superintendent of the transportation, line department, road and structures and claim adjusters" as well.

Mr. O'Brien is fortunate. He has two babies, one for each knee. He runs both buses and street cars. These may



W. L. O'Brien

not be twins, according to the accepted standards, but in point of passengers handled and attention required Mr. O'Brien rates them about equal. As mentioned before, and figuratively speaking, he has one on each knee, thus he can keep a pair of sharp eyes on each of his transportation babies.

When a stranger looms in the offing at Mystic, the headquarters of the traction company, Mr. O'Brien has one stock question. He admits, without any shame, that he asks every one: "Have you ever been in Rochester?" If you can qualify as even a visitor to the Kodak City it's a great help, whatever your business may happen to be.

Needless to say, Mr. O'Brien was born and brought up in Rochester, N. Y. There he had his early education, there his first traction experience. He hit the platform (this was in 1905) for the New York State Railways. Five years passed. Experience ripened. Ambition spurred on the young man.

In 1910, therefore, he took a conductor's job on the Buffalo, Lockport & Rochester Railway. Soon he became a despatcher and was then advanced to chief despatcher. Opportunity then beckoned again, or Mr. O'Brien reached out for it, and in 1918 he joined the company with which he is still connected. First he acted as despatcher, then as inspector, and then in turn instructor, trainmaster, and finally superintendent.

Outside of keeping the buses and cars running and the boys happy, Mr. O'Brien is keen on such matters as safety and courtesy. He frequently makes addresses at the public schools in his territory, on the subject of safety, and has also spoken before other audiences on electric railway problems. Courtesy he emphasizes at frequent meetings of his operating force. These meetings are held once a month, and while attendance is not compulsory, the men are given to understand that the matters to be taken up are essential to the welfare of the company as well as to each worker, so that rarely does the attendance fall below 100 per cent. Outsiders of prominence are called in frequently to talk to the boys, and smokes and refreshments are provided at the meetings.

Mr. O'Brien has some decided and interesting opinions about the modern transportation official. Personally, he must be a congenial sort of chap, he believes. He must lead a clean life. He must preach courtesy and practice it. He must know his business and know it well. He must be somewhat of a public speaker, and incidentally, should cultivate the press so as to enjoy and deserve its good will. Above all, the real transportation official of the present day is one who can make the work of the men under him, his transportation salesmen as they are, sufficiently interesting, so that each one will be proud of his work and will be a booster for his company.

## L. G. Higgins, Bus Pioneer

L. G. Higgins of New Orleans is entitled by his early activities with motor buses to be classed among the pioneers in the bus transportation industry of Louisiana. As long ago as 1907—and this is long ago in the bus transportation field—Mr. Higgins started Higgins' Tours, now known throughout the country. This is a service which he still maintains and operates with sightseeing cars that cover practically every point of historical interest in and about the parish of Orleans. He also operates two buses between New Orleans and Baton Rouge,

the State capital, on a stretch of road along the Mississippi River of about 118 miles. The distance between these two points by rail is only about 90 miles, but in following the contour of the river, behind which levees and roads were built and settlements established by the pioneers, he has been able quickly to reach a prosperous territory hitherto inaccessible except by steamboats or by stage from railroad stations.

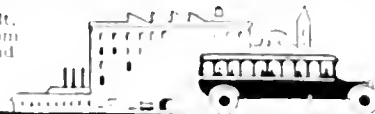
Mr. Higgins also operates two buses between New Orleans and Convent, on the road to Baton Rouge. Convent is about 62 miles distant from the city. This service has been recently established. One bus line running from New Orleans to Pointe a la Hache, about 52 miles, is included in his earlier ventures in bus transportation. The service is still maintained by him. Among the latest of his undertakings will be a service between New Orleans and Shell Beach, in the parish of St. Bernard, about 30 miles from New Orleans. A fine hard shell road is maintained by the parish to this famous local resort, renowned as fishing and hunting grounds and much frequented summer and winter by local and visiting sportsmen. Shell Beach is also reached by railroad, with which Mr. Higgins will now attempt to compete. It lies within the great truck-farming regions contiguous to New Orleans, from which the city obtains most of its garden truck and a large part of its game and fish.

Mr. Higgins is a staunch advocate of hard-surface roads and is aligned with every movement which gives promise of better and more enduring roadways in this section of the state. The soil of Louisiana makes it difficult to keep the roads in good repair, particularly during the rainy season, and this is especially so of the route between New Orleans and Baton Rouge, where tractors have to be employed at times to "yank" the buses out of the ruts into which they become imbedded. Despite these handicaps, Mr. Higgins has established a reputation for rapid, dependable bus service. It is quite natural that he should look forward to still greater achievements with the prospect ahead that the concrete road is coming soon in Louisiana. This will be a boon to the bus business of the state.

It has been said that Mr. Higgins was a bus pioneer. That is true. The evidence of it has already been set down here. It was natural, however, that he should enter the bus business. He had long been an automobile machinist, with an intimate knowledge of motor cars and their construction. This knowledge was reinforced with a thorough grasp of woodworking. Thus did he lay the foundation upon which he built the organization for his "tours." The other services in which he is now engaged were the natural outcome of this venture. All in all, Mr. Higgins has been active in the automobile field in New Orleans for twenty-five years. He is a native of Barnesville, Ga.

# Business Information

What is being bought and built, latest news from the factories and the field.



Manufacturers  
Reporting the  
Industry,  
The changes in  
important  
and prices

## Tire Makers Offer Suggestions

Urge Users to Give Greater Thought to Equipment—See Market Being Stabilized

**T**IRE manufacturers feel that the lowest point has been reached in the present cycle of downward prices. The recent past has been a very severe one so far as the producer is concerned. A number of diffuse elements have all contributed to the reductions in prices for tires, but the industry is now fast being stabilized, it is believed. The problem of readjustment has been the manufacturers' alone, but the fact that manufacturers feel that the bottom has been touched is of interest to all tire users.

No matter how anxious the consumer may be to purchase at the lowest possible figure, it still remains a fact that his interest is one with that of the manufacturer. It is inevitable that this should be so. The chain of circumstances that make it so do not need to be reiterated here. Sight should not be lost of the fact that the manufacturer, through the sources of information available to him, is able to gauge with accuracy the demand for bus tires because they represent only a small part of the total tire production and the number of consumers is comparatively small.

### OPERATORS SHOULD ANALYZE TIRE NEEDS

So far as the bus men are concerned, manufacturers are concerned over one thing. They are all anxious to see that every user gets the greatest degree of service. This is only good business. In this respect some of the manufacturers do not feel that the bus men are doing themselves justice. Call it a complaint, if you will, but the manufacturers feel that the bus men in some cases do not analyze their needs with sufficient care. This too often results in the purchase of a type of tire not fitted to give the best results for a particular kind of service. For instance, in city service pneumatic tires are often used where cushions or solids might give adequate service, and in intercity service solids are used where pneumatics would be preferable. The data are all available to the tire user, and the suggestion from the manufacturers is that the consumer study his own problem carefully and then draw upon the knowledge of the seller, bearing in mind, of course, the preferences of the riding public. Some tire manufacturers suggest particularly to bus owners the desirability

of considering the use of rims of 20 in. diameter rather than those of 24 in. diameter. Manufacturers know that marketing conditions in the general tire industry are not 100 per cent perfect.

## Criticism of Oil Producers Declared Unjust

Petroleum Men Insist Prices Have Been Kept as Low as Conditions in the Industry Justify

**P**RODUCERS of gasoline and other petroleum products are not unmindful of the criticisms that have been leveled against them recently with respect to price movements, but they do look upon many of them as particularly unfair. Very properly they are entitled to be heard. Their voices have been pretty nearly drowned, however, in the clamor for a victim, particularly the political clamor. The calm facts are that the overproduction of crude and the overproduction from refineries have made the prices realized by the refiners generally disproportionately lower than the prices paid by the consuming public, thus making the refiners bear often times a loss in their transactions in the flow of oil from production to consumption. The condition just outlined does obtain, of course, where the larger companies, which are able to sustain it, control the flow from production to consumption. Nor can it be said that the consumer's price, regarded as a whole, has been out of line under proper considerations of costs of production, transportation, marketing and distribution. In this connection the pres-

## Gasoline Prices—Nov. 26, 1923

City	Cents per Gal. Tank	Service Station
Albany, N. Y.	15 5	18
Atlanta, Ga.	13	18
Boston, Mass.	14 5	17
Chicago, Ill.	12	14
Detroit, Mich.	10 8	12 8
Fort Worth, Tex.	6	9
Indianapolis, Ind.	12 2	16 2
Jacksonville, Fla.	13	18
Kansas City, Mo.	10 9	13 9
Louisville, Ky.	13	16
Memphis, Tenn.	13	17
Milwaukee, Wis.	12	14
Mobile, Ala.	15	17
Newark, N. J.	15 5	*
New Haven, Conn.	16 5	20
New Orleans, La.	11 5	14 5
New York, N. Y.	15 5	18
Oklahoma City, Okla.	12	16
Omaha, Neb.	12 25	14 25
Philadelphia, Pa.	16	21
Pittsburgh, Pa.	16	21
Richmond, Va.	15	21
St. Louis, Mo.	11 6	13 9
St. Paul, Minn.	12 9	14 9
Salt Lake City, Utah	16 5	21
San Francisco, Cal.	11	16
Seattle, Wash.	12	16
Spokane, Wash.	16	20
Washington, D. C.	15	18

\* Dealers in New Jersey set their own prices.

ident of the National Petroleum Association, speaking at the recent meeting of that body, challenged the statement that the general prices paid by the people for gasoline and other petroleum products have not been maintained at as low a point as justifiable.

Violent swings in price movements are bad for all concerned. Actions and reactions pretty nearly compensate each other. So far as the producers are concerned there is a hopeful sign in the fact that there is now a tendency to repress rather than stimulate production in the California fields, where enormous production, surpassing anything that has existed in Mexico, has had a profound effect upon the general situation. Some consumers there are who may still think that they are not concerned with conditions that affect the producers, but this is not the fact, no matter what the demagog might say. Realizing that the recent La Follette investigation was unduly political the National Petroleum Association remained silent.

Men in the industry point out that the production of Pennsylvania crude oil is practically impossible at less than present costs, and that as a result there was no room for producers in that field to take up some of the slack between profit and loss on the part of the refiners. Recent efforts have been made, however, to establish Pennsylvania products upon a basis higher than other products. In addition, efforts will be continued to secure rates for exportation of petroleum products below the established domestic rates, which offered another measure of relief.

### Demand for Buses in Chile

Demand for buses and bus equipment is increasing in Chile, according to Department of Commerce reports, which also state that the greatest center of activity in this regard is the city of Santiago, where bus transportation is growing rapidly.

## Rolling Stock

**Davenport, Iowa, School Board** recently purchased a thirty-passenger bus for the transportation of school children in that city. The chassis is of independent manufacture. The body was built by the Davenport Body Company. The exterior is finished in olive green, and on the sides appears the legend, in silver letters, "Davenport Public Schools."

**Blue Line, Gooding, Idaho,** contemplates the purchase of four additional buses for use on its 200 miles of intercity routes in Idaho.

**Blue Ridge Transportation Company, Hagerstown, Md.,** will add to its equipment in the near future to take care of the increasing popularity of its service.

**West Jersey Transportation Company, 131 South Twenty-fourth Street, Philadelphia, Pa.,** intends to buy two twenty-five passenger buses soon.

**Peoria White Star Bus Company, Peoria, Ill.,** needs five more buses to take care of its increased business, according to a recent announcement of the company.

**Costa Rica Motor Company, San José, C. R., C. A.,** expects its enlarged business to compel the addition of several buses to its fleet of three now operating over a 27-mile route in Costa Rica.

**Thomas D. Lee, Inc., South Bend, Ind.,** will purchase five buses to accommodate an increase in business.

**Wurd-Way, Inc., Muskogee, Okla.,** recently added three model 50 White buses to its equipment running over three intercity routes covering 124 miles of Oklahoma highways.

**Arizona Bus Company, Prescott, Ariz.,** will add four buses to its fleet of nineteen running from Prescott to Jerome and from Prescott to Humboldt and Mayer in Arizona.

**Intermountain Transportation Company, Anaconda, Mont.,** contemplates the purchase of several buses for operation on a 27-mile route in Montana.

**Mesaba Transportation Company, Hibbing, Minn.,** will soon add to its fleet of thirty-five buses running over 220 miles of Minnesota roads in intercity and city service.

**Beaverdale Auto Bus Company, Beaverdale, Pa.,** is considering the purchase of a new bus to take care of an increasing business. This line operates over an 8-mile route between South Fork and Beaverdale, Pa.

**Comet Bus Service, Hamilton, Ont.,** is constructing two buses in its own shops. These will be added to a fleet of four vehicles now operating in intercity service on a route covering 41 miles.

**A. A. Johnson, Chico, Cal.,** will add one sixteen-passenger White bus to his equipment in the near future.

**Richmond Rapid Transit Company, Richmond, Va.,** will add fifteen twenty-five-passenger White buses to its lines operating in that city.

**Townus Bus Line, Harrisonburg, Va.,** plans to purchase two buses for use on its 9 miles of route in Virginia.

**J. A. Todd, Poplarville, Miss.,** will add to his equipment now operating over a line 24 miles long in Mississippi.

**Modern Bus Line, Needham, Mass.,** will purchase one thirty-passenger single-deck coach for use on its 4-mile line in Needham and vicinity.

**Bridgeport & Waterbury Passenger Service, Inc., Bridgeport, Conn.,** has signified its intention of adding five buses to its fleet of eight buses.

**Harry A. Cohen, 128 Barbour Street, Hartford, Conn.,** will purchase another bus to add to his equipment which he uses for private hire only.

**United Transportation Company, Inc., Albany, N. Y.,** is to purchase four buses in the near future.

**Buffalo-Akron Transit Company, 30 East North Street, Buffalo, N. Y.,** will soon order a thirty-passenger bus for use on its 25-mile route.

**Fred Bliss, 79 Maple Street, Oneonta, N. Y.,** expects to add to his bus equipment in the near future.

## Business Notes

**Acme Motor Truck Company, Cadillac, Mich.,** announces that Charles J. Helm has been appointed general manager of the firm to fill the place of Walter A. Kysor, who recently resigned from that position. Clarence E. Williams has been elected president. Charles A. Ward, Jr., formerly assistant sales manager, takes the place of Mr. Helm as sales manager.

**Allen-Russell Body Company, Lansing, Mich.,** announces that work has begun on a new warehouse and salesroom on South Washington Avenue, Lansing. The firm will carry a complete line of truck bodies of all kinds, including bus bodies, panel bodies, furniture bodies, special bakers' bodies, school bus bodies, steel dump bodies and hoists—in fact, every kind of equipment for the truck chassis.

**Eiseman Magneto Corporation of Brooklyn, N. Y.,** announces the resignation of Charles Ethan Davis as general manager. It is Mr. Davis' intention to travel extensively through Great Britain and the Continent for an indefinite period. John H. Allen has succeeded Mr. Davis as general manager of the corporation. Mr. Allen has had wide engineering and manufacturing experience. For several years he has been associated with the organization in the capacity of works manager and assistant general manager.

**Fyrac Manufacturing Company, Rockford, Ill.,** and the **Clymer Manufacturing Company, Denver, Col.,** have cross-licensed each other for the manufacture of through-the-windshield spotlights. Both companies possess patents, and have patents pending, on through-the-windshield spotlights and a special tool for cutting a hole in the wind-

shield without removing the glass. These patents include the basic Vallot patent. It is generally understood that all other through-the-windshield spotlights infringe the Fyrac-Clymer patents and it has been announced that legal action will be started immediately against all infringers.

**Bureau of Railway Economics, Washington, D. C.,** announces its new address as the Transportation Building, 17th and A Streets, N. W.

## Garages and Shops

**Blue Line Bus Company, Sumner, Wash.,** will build a \$30,000 bus terminal and garage in Sumner at once, according to a recent announcement of Conlon Brothers, proprietors. The terminal will be located at Ryan and Main Streets. The plans call for a single-story brick structure which will entirely cover a site measuring 100 x 100 ft. The building will be so constructed that the large buses operated by the line can drive directly inside, load and discharge passengers. A novel feature will be the washing department designed to thoroughly wash a car within five minutes after it has come in from a run. The company will maintain its own repair department in this building. Space for four stores will be included in the structure, and offices of the line will be maintained in a suite fronting on Ryan Street.

**Minneapolis, Minn.,** is to have a new \$200,000 motor bus terminal, which will supplant the present Union Bus Depot at Seventh Street and First Avenue. North and offer far more convenient facilities for the bus-traveling public, according to E. L. Bryant, president of the Minneapolis Motor Bus Terminal Company. Mr. Bryant says that the terminal will be built early next spring.

**Springfield Avenue Bus Association, Newark, N. J.,** recently signed contracts for a \$60,000 garage to be erected at Springfield Avenue and Forty-second Street. The garage will house fifty buses and will be built of tapestry brick. There will be a repair and supply department maintained by the management for the company members. The contractors are Wilson & Stranino.

**Paget Sound Power & Light Company** announces that tentative plans are under way for a terminal in Bellingham, Wash., at the corner of Elk and Magnolia Streets, to serve the company's bus and traction lines terminating in Bellingham. The proposed structure will be three stories high, with full basement, 150 x 125 ft. in size. The estimated cost is \$200,000.

## Advertising Literature

**Reo Motor Car Company, Lansing, Mich.,** has published a booklet, "Passenger Bus Transportation on a Speed Wagon Chassis." In its thirty-two pages photographs of a large number of Speed Wagons used for bus service are reproduced, and it is said that in the total output of Speed Wagons, buses vary from second to fifth place month by month and have done so for years.

**International Motor Company, New York, N. Y.,** has recently published a pamphlet describing its shock insulator bus. Under the heading "Getting Down to the Meat" is discussed the advantages of various parts from the point of view of maintenance. The pamphlet also contains illustrations showing types of buses supplied and in use by bus operators.

**Remy Electric Company, Anderson, Ind.,** has issued a looseleaf booklet under the heading "Motor Bus Electrical Equipment." This describes the heavy duty generators the company makes for bus service, with either transmission or flange mounting; the bus panel which incorporates the junction boxes, fuse panel and switches of the electrical system, and finally gives comprehensive recommendations for wiring buses to get the best efficiency.

**Edison Lamp Works of General Electric Company, Harrison, N. J.,** has issued bulletin L. D. 148 containing information on lighting legislation compiled by G. H. Stickney of the Lamp Works lighting service department. While this is devoted primarily to a summary of the lighting codes used for industrial, school and other building installations, the laws relating to motor vehicle lighting are also treated. Specifications are given for both head lighting and tail lighting, and at the end of the bulletin are cited a number of important references to articles on these subjects.



# HOOVER

## BUS BODIES

### A nother Fleet of 897's

The East Fayette Street Bus Co., of Baltimore, Md., has recently purchased 9 Type 897 Hoover Bus Bodies.

Their decision to standardize on Type 897 equipment again reflects the ability of Hoover Bodies to meet all requirements conducive to efficient and profitable bus operation.

Write for our new Bus Catalog which gives definite information concerning the above together with various other types.

**HOOVER BODY COMPANY**  
**YORK, PENNSYLVANIA**

Eastern Sales Branch, Long Island City, New York





## Combining Superlative Passenger Comfort With Dependability and Economy of Operation

Keeping ahead of competition by providing the public with the most advanced and luxurious type of motor coach transportation not only attracts capacity patronage, but is in full accord with the strictest program of economy.

The Garford Knight-Motored DeLuxe Motor Coach, Model 51, pictured above, possesses a new and distinct appeal to bus patrons. The long, low limousine lines, the detailed attention that has been given to passenger convenience and comfort, the look of dependability, unite to create public interest and favor.

This new Garford may be depended upon to maintain rigid schedules on short hauls or

extended trips. Adverse weather and road conditions affect neither its running ability nor its remarkably low cost per passenger mile.

The operation of such a coach as this eliminates the necessity for heavy investment in spare units for emergency use. Repair and replacement expenses are so rare as to become a negligible consideration. Far more profitable business can be done on the same investment of money.

Prepare to make 1924 your most profitable year by writing for the seasoned advice of Garford engineers. Complete facts concerning this and other models of Garford coaches will be sent on request, without cost or obligation.

**The Garford Motor Truck Company, Lima, Ohio**

Manufacturers of Motor Trucks and Motor Coaches

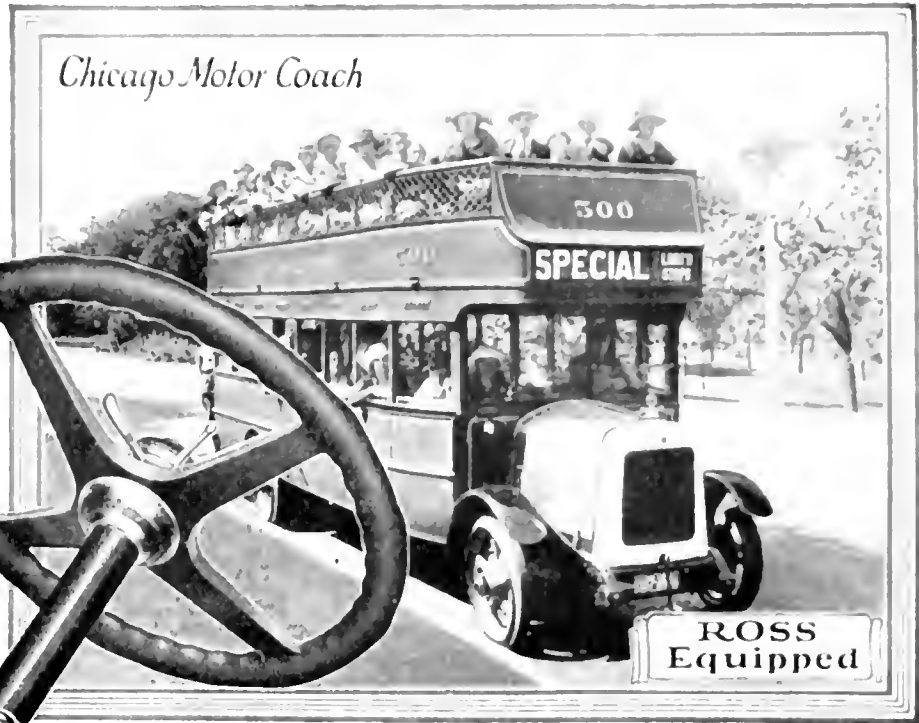
# GARFORD

## DEPENDABLE TRANSPORTATION



Steering Gears  
for

Passenger Cars  
Motor Buses  
Motor Trucks  
Fire Trucks  
and  
Tractors



## Giant Bus, Heavily Loaded, Steers Like Touring Car

EASY steering and positive control, with resulting safety of passengers, is assured in the buses of the Yellow Coach Manufacturing Co., Chicago. Equipped with the Ross Cam and Lever Steering Gear, these Yellow Coaches, with full load, are "as easy to steer as the finest touring car", says Mr. George A. Green, Vice President. And he adds, "There is complete absence of road shock at the steering wheel."

### Long Leverage—Variable Pitch

The long lever arm inside the new Ross Gear is the source of the enormous power which makes steering so easy and reduces unit pressures to a point where wear is negligible. In turning, the variable pitch of the cam produces a unique accelerated action at either extreme, which makes it easier to turn corners. And the Ross Cam and Lever Gear is so irreversible that practically all road shock is eliminated. Compact and simple in construction, the Ross Cam and Lever Steering Gear offers vital advantages in ease of steering, positive control, reliability, safety and service to motor bus manufacturers and truck makers.

### Investigate!

Ross Steering Gears have been used for many years as standard equipment on the familiar motor buses of Michigan Boulevard and Sheridan Road. For superior steering service investigate the new Ross Cam and Lever Steering Gear. Full information on request. Write us today.



ROSS GEAR & TOOL COMPANY 960 Heath St. LAFAYETTE, IND.

# ROSS

## CAM and LEVER STEERING GEARS

EASIER STEERING - LESS ROAD SHOCK

# 18 $\frac{1}{2}$ c. Per Bus Mile

For the past two and a half years the Washington Rapid Transit Company have been operating a large fleet of Duplex Buses in Washington, D. C., at an average cost per bus mile of 18 $\frac{1}{2}$  cents, and they have been making money.

This cost covers every item of expense, including administrative and insurance costs, as well as depreciation at the rate of 33 1-3 per cent. per year.

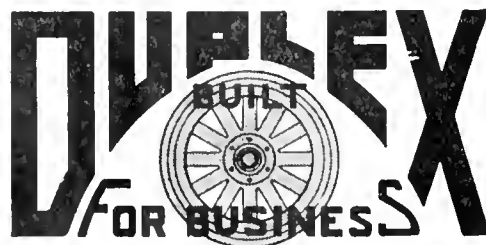
We are now producing an improved model containing every up-to-date bus feature, and retaining all the features that have made the Duplex Bus such an economical and dependable transportation vehicle.

*Write at once for complete details.*

**DUPLEX TRUCK COMPANY**

*Motor Bus Division*

Lansing, Michigan



**A new and better pneumatic tire  
for buses and trucks**

# ***The U. S. Royal Cord***



**T**HE man who puts on U. S. Royal Cord Bus-Truck Tires today is starting off on a period of pneumatic tire economy never matched by any experience he has ever had with casings for heavy vehicles.

It was not possible to make such a pneumatic for trucks and buses before the discovery of U. S. Web Cord and U. S. Sprayed Rubber.

The two most important improvements in tire construction since the advent of the cord tire.

The U. S. Royal Cord Bus-Truck Tire has the Royal Cord Tread — slightly altered to meet the conditions of heavier work.

A tread that has been the standard of surefooted traction since it first appeared on the market.

The new U. S. Royal Cord Bus-Truck Tire has qualities of cushioning and safety that no more than a year ago were considered out of reach.

Made in all standard truck sizes. Ask the nearest U. S. Truck Tire Dealer.



# **United States Tires**

United States  Rubber Company



## The Human Element in Transportation

Transportation managers now know that the driver's attitude toward his bus is one of the most important factors in haulage costs.

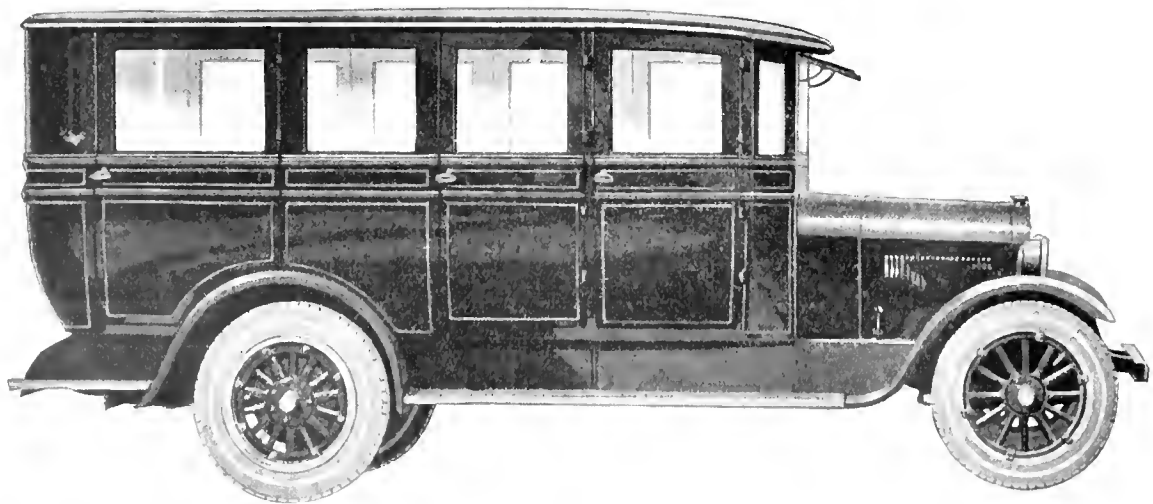
Consequently they are giving serious consideration to his likes and dislikes in selecting their equipment.

In addition to long life and dependable performance, they are demanding real riding comfort and easy steering.

The growth of this demand is turning their attention more and more to Graham Brothers Busses. Because, in the building of these busses, it is always borne in mind that the human element in transportation is fully as important as the mechanical.

*1 Ton Chassis, \$1265; 1½ Ton, \$1325;  
f. o. b. Detroit or Evansville, Ind.*

GRAHAM BROTHERS  
Detroit



# GRAHAM BROTHERS TRUCKS

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE



---

# *Attention Electric Railways!*

We will furnish new Motor Coaches in exchange for  
your obsolete Railway Equipment  
**ASK US!**



## **Selden**

### *The 100% Safety Coach*

With full flexible frame—solid forged—free from rivets  
Also low underslung frame—72-in. gauge  
Compensating rear springs—with radius rods  
Oversize brakes—8 shoes locomotive cam type  
Brown-Lipe clutch and transmission—Spicer universals  
Continental Red Seal Motor—special motor coach type  
Overload capacity—low maintenance  
No ramp in floor of body—no side sway

***Satisfaction***

***1000 Service Stations***

***Stability***

*Send for Motor Coach Bulletin*

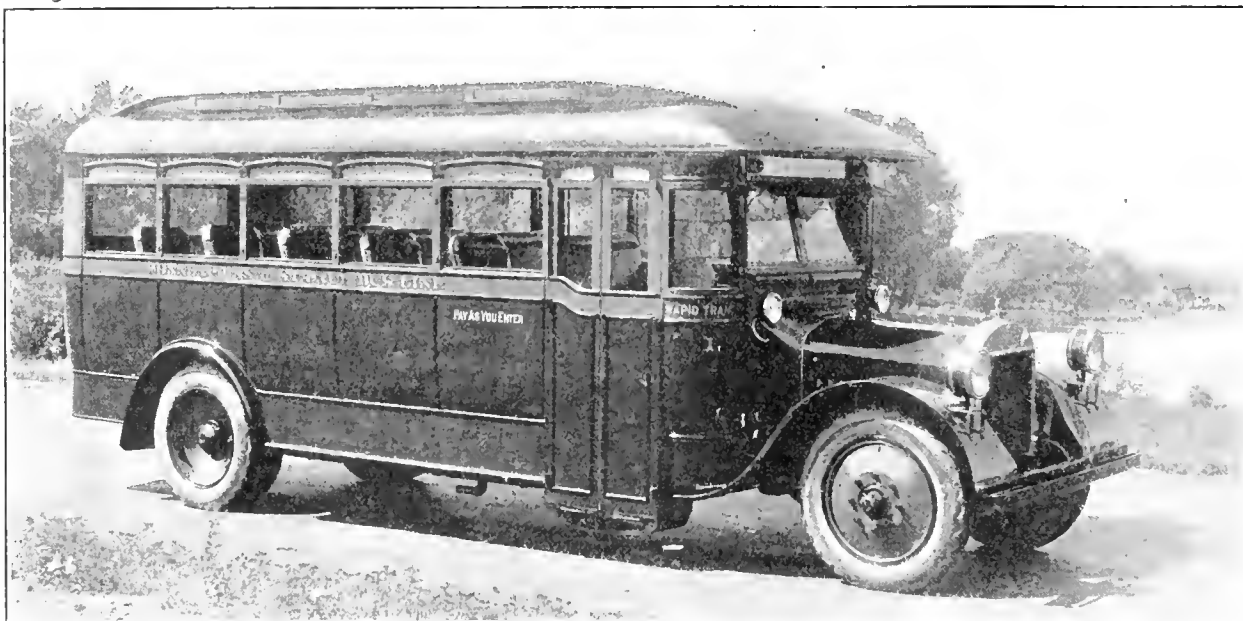
Motor Coach Division

**Transit Equipment Company**  
**New York**

*Distributors to Electric Railways*

---

# Better Built Bus Bodies



**I**N THE manufacture of our Bus Body we are producing a body of the highest standard quality, beautiful in design, strong and sturdy in construction, perfectly ventilated, easy and comfortable riding, well electric lighted and highly finished, and free from any rattle.

Through many years of experience in the building of bus bodies we have thoroughly studied the many needs of the riding public and of the bus operator through which we have developed many features not found on the ordinary bus body.

Our ventilation system is very efficient having an intake which receives the air in the body causing all foul and dead air to leave through the vents in the roof, thus creating clean and fresh air at all times and with not the slightest draft noticeable. This is a very valuable feature owing to the necessity of the low construction necessary in a bus body.

We adopted the cupola roof after experimenting in the construction of many styles of flat and round roof bodies, we found it impossible to build a body with the proper head clearance, without being top heavy, with the proper ventilation and without a great deal of roof vibration.

With our cupola roof construction we have a body with the necessary head clearance, perfectly balanced, top heaviness entirely eliminated, perfect ventilation and no roof vibration.

Our heating system is very efficient, taking the heat from the exhaust and distributing it to both sides of the body, through the proper amount and size of pipe. The exposed pipes to the cold are asbestos covered and the pipes inside of body are well protected with guards preventing any possible danger of burning passengers wearing apparel. Our bodies being equipped with full set of storm windows and with an efficient heating system provides a comfortable riding bus in the coldest of weather.

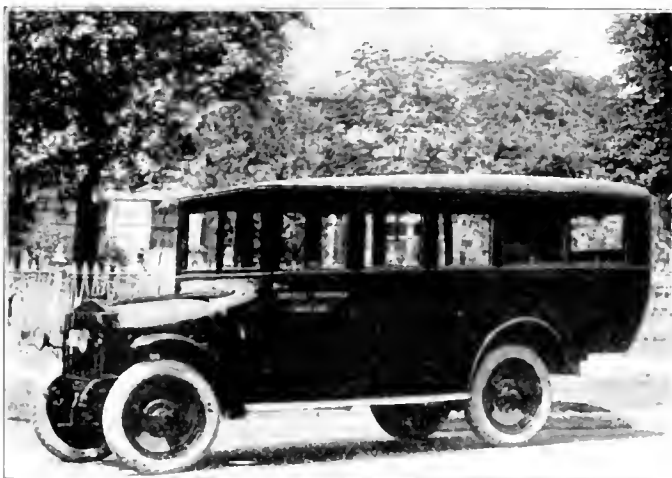
There are a great many more excellent features such as; metal window lids with continuous hinge, brass sash with anti-rattling devices, danger and marker lights, dome and step lights, electric roller destination sign, slanting windshield with sun visor, double door entrance with operating controlled from drivers' seat, standing hand rails, seat grab handles, soft comfortable riding seats with heavy duty spring construction. Why not order ECKLAND BETTER BUILT BUS BODIES for your new equipment

**ECKLAND BROS. COMPANY, Minneapolis, Minn.**

## ECKLAND BUS BODIES

*"Standardized for Economy"*

If we didn't have something real to back our statement that **FEDERAL Trucks** are the most modern trucks sold today we wouldn't be entitled to your patronage.



### In Passenger Work

Federal Trucks have made good. Thousands of Federal Busses are hauling hundreds of thousands of people daily. This Rockville - Indianapolis (Ind.) Federal bus is making money.

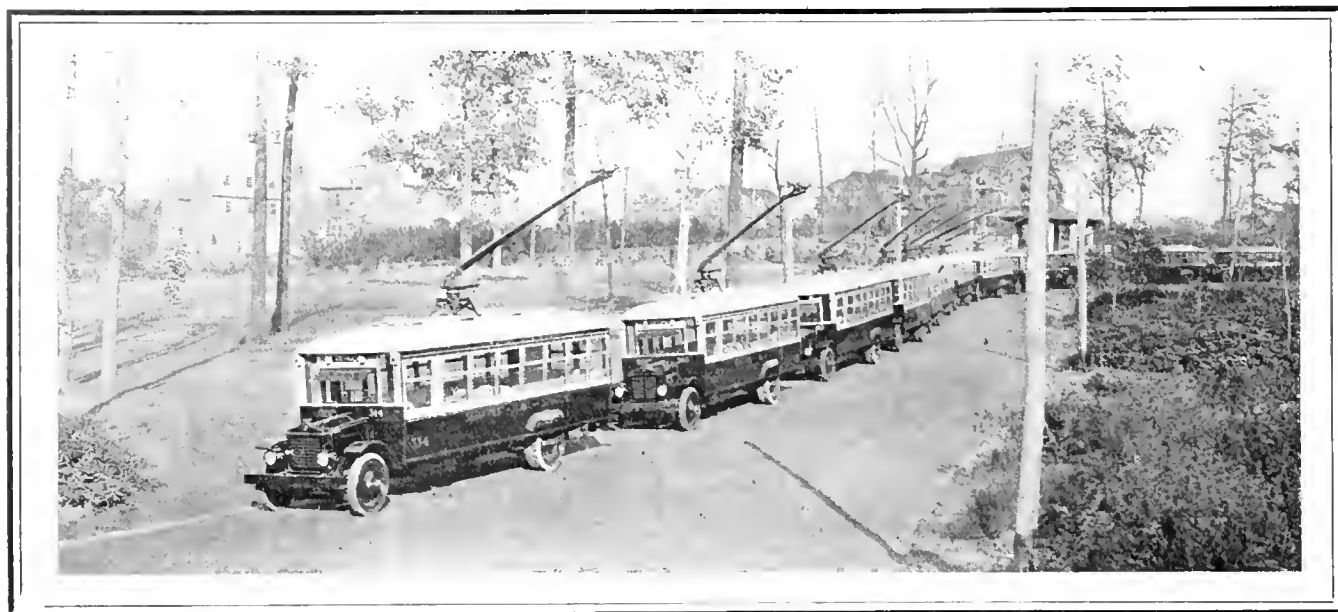
*Write for Booklet S18, "Making One Thing Better."*

**FEDERAL MOTOR TRUCK COMPANY**  
DETROIT, MICHIGAN

# BROCKWAY

Passenger Transportation

# EQUIPMENT



## More Trackless Trolleys for Staten Island, N. Y.

The fifteen Brockway Trackless Trolley Cars pictured above have been in successful operation for more than a year on Staten Island, New York City. The Department of Plant and Structures, City of New York, under whose direction these Trackless Trolley Cars are operated, has placed an order for *nineteen more* Brockway Trackless Trolley Cars.

*Ask us for the facts*

**BROCKWAY MOTOR**

Cortland



**TRUCK CORPORATION**

New York

*Originators of low center of gravity transportation equipment*

# BROCKWAY

## Passenger Transportation EQUIPMENT

### City Officials of Rochester, N.Y. Favor the Trackless Trolley

Leading article on the front page of the Rochester Journal, November 21, 1923, told of plan to increase and extend trackless trolley service in that city. The following statements are quoted directly from the article:

"Mayor Van Zandt's instruction to Commissioner of Railways Barnes was that the crosstown trackless trolley line be extended along Driving Park Avenue to the New York Central Railroad bridge, approximately a mile beyond the present terminal of the trackless trolley line."

"In explaining his action, Mayor Van Zandt said:

"This is not to be construed as the beginning of a movement to eliminate immediately street car tracks in Rochester, though from what I have observed of the operation of trackless trolleys I would recommend the abolition of all tracks at

once, were it possible to have a transformation to rubber tired vehicles for public transportation.

"The demand for an extension of the trackless trolley line along Driving Park Avenue west of Dewey Avenue originated with the people on the street, who would be relieved of the noise of passing street cars.

"From what they have seen of their operation east of Dewey Avenue, they are satisfied they are an advancement in municipal transportation and to be desired above noisy street cars."

## More Trackless Trolleys for Rochester, N. Y.

The New York State Railways, Rochester, N. Y., are now operating five Brockway Trackless Trolley Cars and seven Brockway Gas Buses. It's evident from the above news item, that they're going to need more *because the public like them!*

Railway Companies in all parts of the United States and in several foreign countries are investigating Brockway Passenger Transportation Equipment.

*Let us show you its possibilities*

**BROCKWAY MOTOR**

Cortland

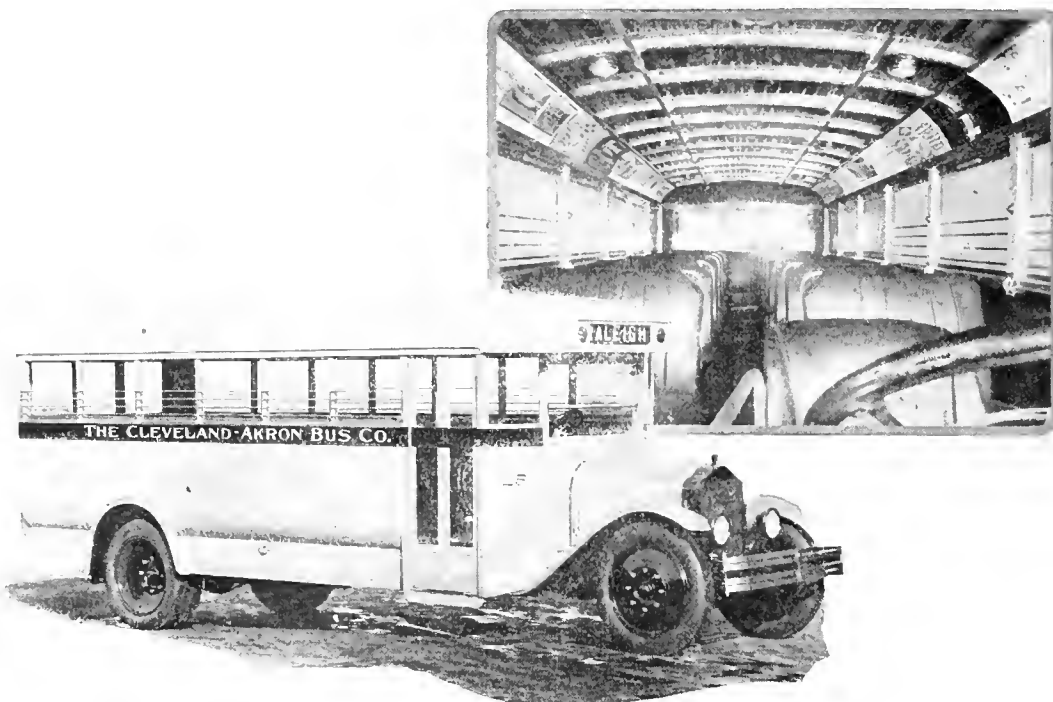


**TRUCK CORPORATION**

New York

*Originators of low center of gravity transportation equipment*

# SCHAEFER BUS BODIES



## A Schaefer Body Is an Investment that Pays Dividends Year after Year

### *New Exclusive Features*

A new door that is rattle-proof in any position. Convenient and easy to operate. (On Pay-Enter Bodies only.)

New Sanitary Window Sills prevent dropping articles down into sill when window is open.

*Write us for complete details*

When you buy a Schaefer Bus Body, you are making an investment that is permanent and sound. A Schaefer Body does not have to be replaced after two or three years of hard service. They are built to stand the hardest kind of usage. Schaefer Bus Bodies are built to the same standard of quality that has made Schaefer Wagons and Coach Work famous for nearly half a century.

Our way of building durable bus bodies is entirely different from most present-day methods. All of our lumber is air-seasoned—the old-fashioned, time-tried way of retaining ALL the natural strength and toughness in the wood.

Five years in advance of requirements, we buy our various woods and store them away in closed sheds—each piece separated from the other. Nature does the rest. Kiln or oven drying is the result of a demand for quicker drying of lumber—but, like other imitations, it cannot equal the natural way.

Due to our way of manufacturing, Schaefer Bodies last longer than most bus bodies. They are easy riding, well constructed, practical bus bodies of fine appearance.

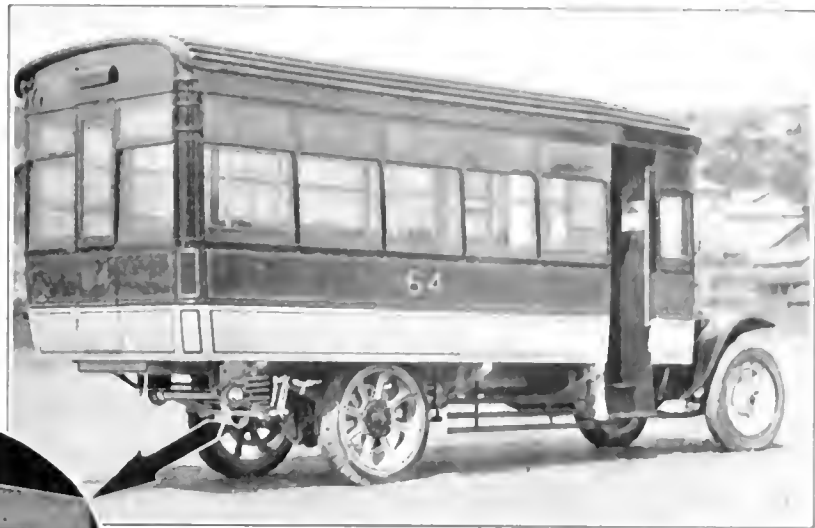
### The Gustav Schaefer Wagon Co.

Leading Vehicle Builders since 1880

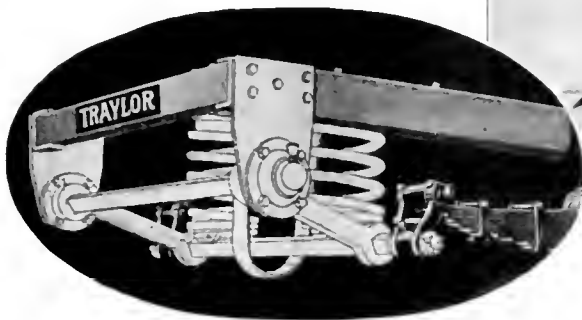
4180 Lorain Avenue, Cleveland, Ohio



# HIFLEX SPRING SUSPENSION



One of Frank Martz' Hiflex-equipped buses which is giving unusually popular service in the Wilkes-Barre district.



## “—solved riding difficulties”

—says Frank Martz of Plymouth, Pa.

Unqualified endorsement of Hiflex Spring Suspension and its remarkable results is given by this veteran bus owner and operator. Here's the whole letter:

Dear Sir:—

In reply to your letter of the 12th, will say that the Hiflex Suspension Springs seem to have solved all the riding difficulties encountered with buses equipped with solid tires.

Some of our passengers will wait for a bus to come along that is equipped with Hiflex Suspension Springs rather than ride in one that is not so equipped. I realize this is a broad assertion, but nevertheless it is the truth. I hope to have the rest of the fleet equipped before many more months.

(Signed) FRANK MARTZ.

What Hiflex does for Frank Martz on the kind of roads they have in his district, it will do for you. It will change necessity riding into pleasure riding for your patrons. It will reduce maintenance and tire expense for you.

*Let us make a trial installation for you.*

**Traylor Engineering & Manufacturing Co.**  
Allentown, Pa.

*Factory Branches:*

Philadelphia: 921 Thompson St.

New York City: 218-226 Spring St.

*Offices:*

NEW YORK

CHICAGO

PITTSBURGH

LOS ANGELES

SPOKANE



# Paterson Standard Bus Bodies

**Standardized Types mean**  
*quicker delivery — lower prices — better quality*

Why? Because quantity production enables us to purchase best grade materials at most advantageous prices. Because quantity production enables us to systematize work and do it most efficiently. Because quantity production engenders economical design.

You can choose a Paterson Body now which will exactly meet your service requirements.

There are four types of body to choose from in various seating capacities. Many of these ready for 10-day delivery.

*Write for quotations*

**PATERSON VEHICLE COMPANY**

Paterson, N. J.

General Office: 257 Market St.

Factory: 27th Street and 19th Avenue



The Superior De Luxe Coach body illustrated is mounted on a Model 50 White chassis for the Hollywood Realty Company of Hollywood, Florida. Passengers are assured rapid transportation and perfect comfort.

As the De Luxe type of coach usually operates over the longer runs, provision must be made for luggage. Superior provides this roomy two-deck luggage compartment at the rear, made easily accessible by a large single door.

Motor Coach operators have learned that fine appearance and passenger comfort are two leading factors in attracting capacity patronage. Superior Bodies give you these qualities and more.

They give you a mechanically right product that will stand the hard usage it is bound to receive.

Seats in the De Luxe Coach are upholstered with real leather, are big and roomy, with deep cushions that spell comfort to the traveler.

There are coat hangers, ventilators, heating system, smoking compartment, everything to create satisfied patrons for the motor coach operator.

## Superior Bodies Keep Good Company

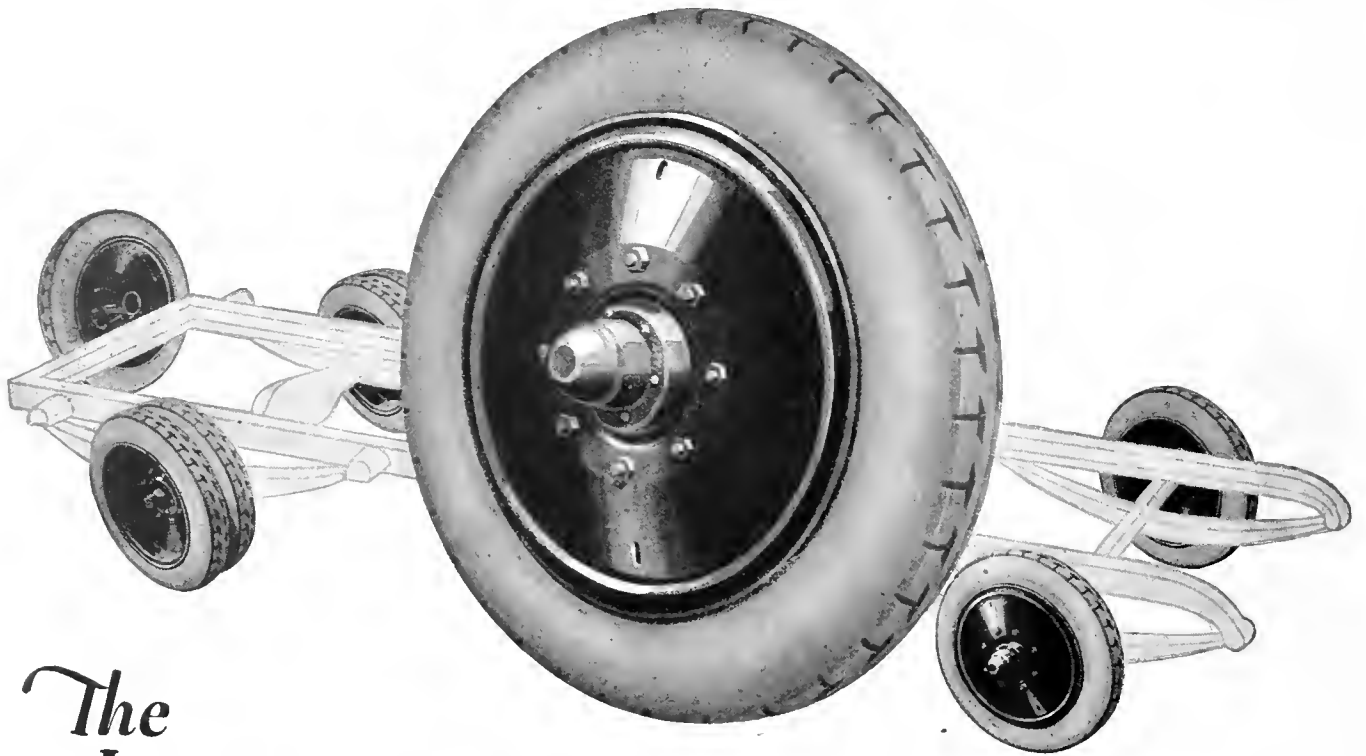
As a man is judged by the company he keeps—so can a product be judged by those whose appreciation it wins. Superior bodies are being delivered to the leading motor coach manufacturers. Their good business judgment, coupled with appreciation of good design and mechanical fitness, won for these manufacturers that leadership. When the same good judgment recommends the purchase of Superior Bodies and critics of design and body engineers endorse the recommendation, we feel that an indication is given of the merit of the product.

Those interested in better Motor Coach bodies should write to Superior for information on the type of body in which they are interested.

If the body illustrated interests you, we will be glad to send detailed specifications.

THE SUPERIOR MOTOR COACH BODY CO.  
LIMA, OHIO

**SUPERIOR  
BODIES**



## *The Importance of Interchangeable Wheels*

Michelin Dual Disc Wheel equipment consists of seven units—two front wheels, two *dual* rear wheels, and one spare.

These seven wheels are exactly alike in size and construction. Each individual wheel can readily be shifted to any part of the bus—or fleet.

As a consequence, only one small spare is required, in place of two spares of different sizes.

Your original investment in rubber is materially reduced. Possible loss from depreciation or theft is greatly minimized. You have a wheel size that any driver can handle—a tire size that is everywhere available. Fleet owners can get along with fewer service tires.

Finally, you have a low, even center of gravity—steadied by the rear duals—which reduces sidesway, gives the bus a pleasing, low-swung appearance and facilitates the entrance and exit of passengers.



An ordinary jack will lift the bus and one man can easily mount the spare wheel and tire.

BUDD WHEEL COMPANY  
PHILADELPHIA

## This Bus is Equipped With



*"ULTIMATE" Bus—Manufactured by FREELAND MOTOR CO., Newark, N. J.*

# Badger Ball Cushions

Eases the strains of bus service on chassis and body.

Gives the public a smooth ride, free from engine vibration and body rattles.

*Examine this picture. Note the simplicity. Nothing to get out of order. Badger Suspension lasts many years without repair or adjustment.*



## Badger Ball Cushion Suspension

E. B. BADGER & SONS CO.

75 Pitts St., Boston, Mass.

Established 1841

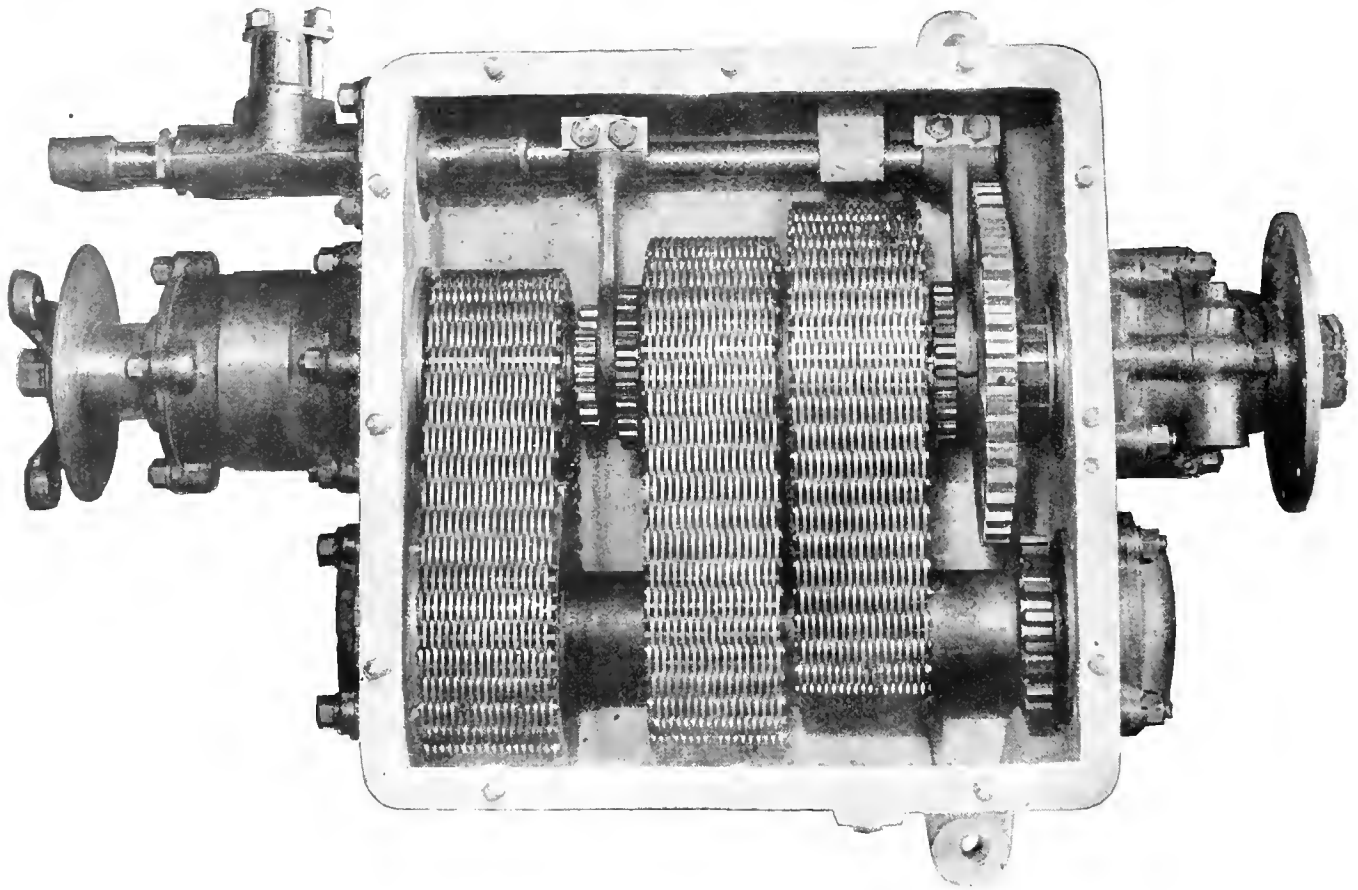
VREELAND MOTOR CO., NEWARK, N. J.

*State Distributors for New Jersey*



*"The Body Seems to Float"*

# The Best Bus Transmission



Just as Morse Chains promote smooth, silent efficiency in the front end drive in engines—Morse Chain transmissions eliminate clashing, noisy, gear shifting for busses.

You should investigate this important advantage of Morse Chain Transmission.

---

## MORSE CHAIN COMPANY

Main Office and Works  
ITHACA, NEW YORK

Sales and Engineering Office  
DETROIT, MICHIGAN

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THE CONSTANT PRESSURE ANGLE CHAIN

---

MORSE

---

GENUINE SILENT CHAIN

---





## *True Economy in a Bus Wheel*

A BUS is no better than its equipment. Especially is this true of one of the most important parts of the bus—its wheels.

Indifference in the selection of bus equipment has been one of the costly mistakes of the past. Now, when service means success and buses must meet the demands of the exacting service of today—operators choose equipment of recognized worth. Their decision is based on proven merit.

Discriminating bus operators realize that true economy in a bus wheel consists of its time and tire-saving qualities and its ability to render exacting service over the longest period of time.

The merits of Dayton Steel Wheels have been

proven conclusively by government tests and by their dependable performance in all climates under adverse conditions.

For true economy insist that your buses be equipped with Dayton Steel Wheels.



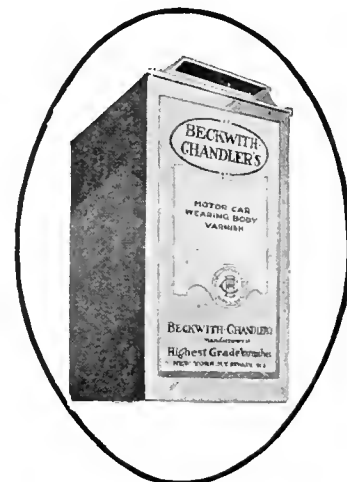
The Dayton Steel Foundry Co.  
Dayton, Ohio.

# Dayton

Steel Truck Wheels

# Beckwith-Chandler

## VARNISHES & COLORS



### To the Operator—

Bright attractive Buses sell Transportation. People who walk are *invited* to ride in fresh painted buses. Such Buses add prestige to the community they serve.

BECKWITH-CHANDLER Varnishes and Colors produce a finish that is

**Durable**  
**Economical**  
**Permanent**

### To the Builder—

BECKWITH-CHANDLER Varnishes and Colors are smooth, easy working and quick drying.

The finest raw materials are used in their manufacture. The colors produce a true, deep and lasting shade.

The varnishes are unaffected by severe weather conditions.

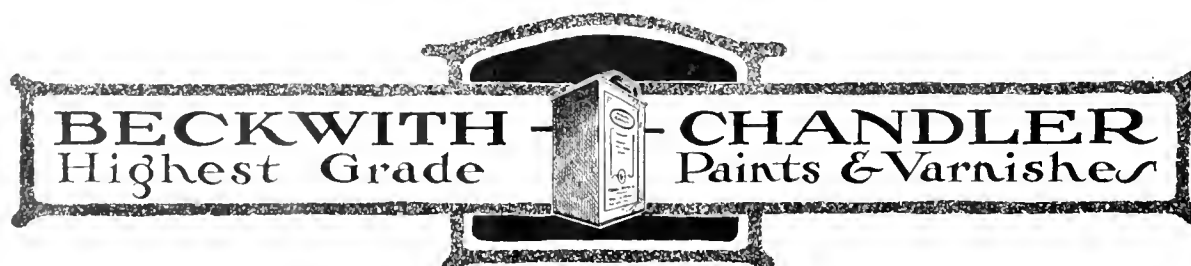
Many large steam and electric railroads use BECKWITH-CHANDLER products exclusively.

*Write for Descriptive Literature.*

**Beckwith-Chandler Company**

193-211 Emmett St., Newark, N. J.

320 Fifth Ave., New York





### *A Few Years Ago—*

Roads and streets were cleared of snow by this slow, expensive and back-breaking method.

The Champion Snow Plow consists of a steel blade, 10 feet long by 20 in. in width, which, thru the medium of a semi-circle and a lifting device, can be given pitch, angle, or vertical adjustment.

This plow can be easily and quickly attached to or detached from any standard make of motor truck or tractor.

The Champion Plow, is simple, extremely durable and easily operated. It will save its initial cost after one big snow storm.

Used and endorsed by Towns, Cities, Counties and State Highway Departments.

Ask for catalogue telling all about this remarkable, labor saving, snow cleaning appliance.

*The*  
**GOOD ROADS  
MACHINERY CO.**  
INC.  
KENNETT SQUARE, PA.



### *Now—*

Roads and streets are cleared of snow quickly and at small expense with a Champion Snow Plow.

# A large majority of the Motor Buses

shown at the recent  
Atlantic City Convention  
were equipped with

## Hale & Kilburn Bus Seats

*This indicates  
Popularity — Adaptability — and Merit*

You cannot afford to miss  
the advantages of these seats

*Write for Particulars*

## Hale-Kilburn Company

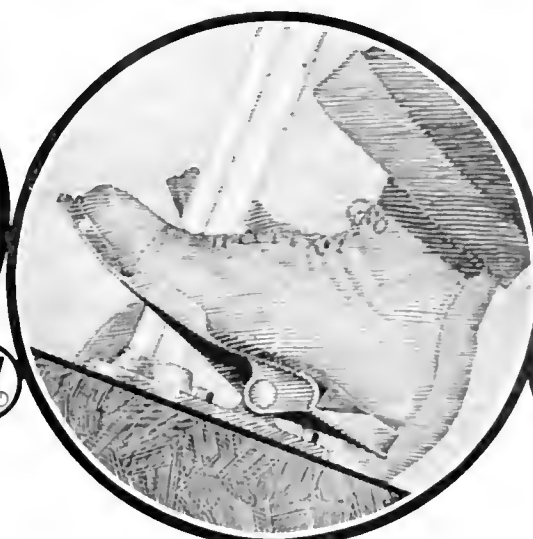
*General Offices and Works: Philadelphia*

*Sales Offices:* {  
Hale-Kilburn Company, 30 Church Street, New York  
Hale-Kilburn Company, 1530-33 McCormick Building, Chicago, Ill.  
E. A. Thornwell, 1513 Candler Building, Atlanta, Ga.  
National Safety Car & Equipment Co., Theresa and Clark Aves., St. Louis, Mo.  
Frank F. Bodler, 903 Monadhock Building, San Francisco, Cal.  
Chris Eccles, 320 South San Pedro Street, Los Angeles, Cal.  
Harry M. Euler Company, 46 Front Street, Portland, Ore.  
T. C. Coleman & Son, Starks Building, Louisville, Ky.

# Reliable Operation



Economy



Simplicity



Dependability



## Keep Your Eyes On The Road

Let the power house and Westinghouse Foot Control simplify the duties of the bus operator, and relieve him of all unnecessary effort.

Trolley busses, equipped with Westinghouse Foot Control, utilize the economical and dependable energy generated in the power house.

Only a slight movement of the small, foot-operated controller is required to accelerate the trolley bus.

All circuits are positively opened or closed in accordance with a pre-determined sequence, and all apparatus, carrying main circuits, is located away from the passengers.

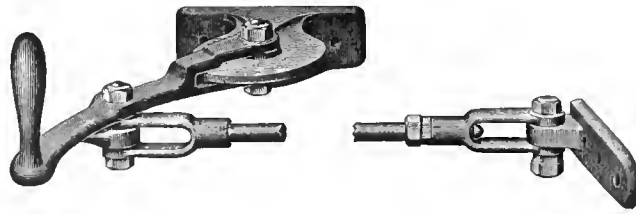
Trolley bus transportation is not a "cure-all," but a possible means of supplying economical transportation to districts not now served.

Westinghouse Electric & Manufacturing Company

East Pittsburgh, Pa.

*Sales Offices in All Principal Cities of the United States and Foreign Countries*

# Westinghouse



No. 5770  
Side Door Control

# BUS BODY IRONS

Side Door Controls  
Rear Door Controls  
Folding Steps  
Hinges  
Ventilators  
Body Braces  
Windshield Hinges

—Produced by—

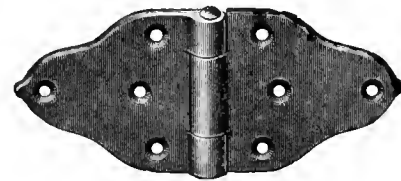
THE EBERHARD MANUFACTURING CO.  
CLEVELAND, OHIO



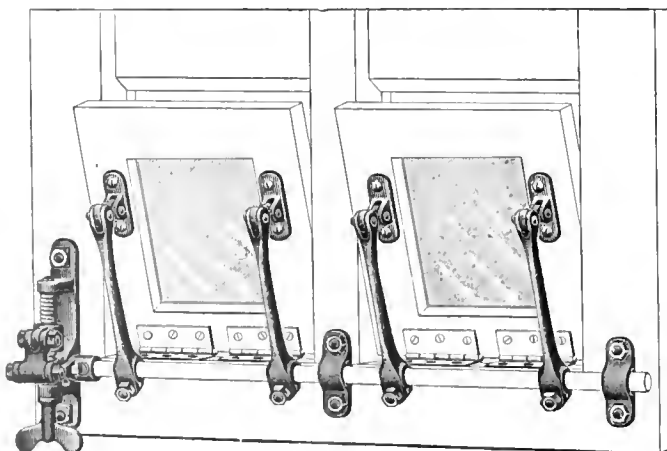
No. 5750  
Ventilator Control



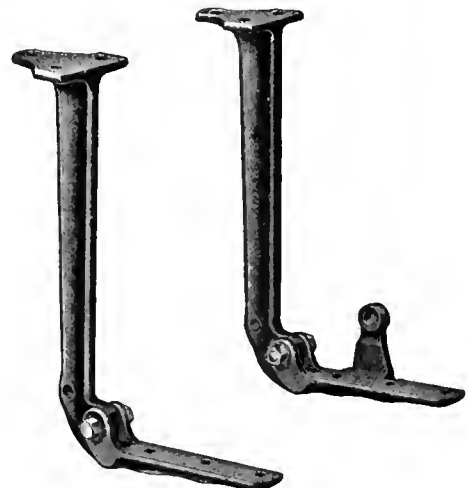
No. 5772  
Folding Door Roller



No. 9485  
Folding Door Hinge



No. 5751  
Ventilators in Series  
(with Single Control)



No. 2705  
Folding Step



# Why Have So Many Bus Operators Standardized on Gruss Air Springs?

Note the partial list below. Ask yourself why keen business men such as these invest so heavily in Gruss Air Springs. Can it be for any other reasons than the fact that Gruss Air Springs do effect an amazing riding comfort that draws trade; that by absorbing road shocks and vibration they do reduce maintenance costs to a notable degree?



Milwaukee Elec. R. R. & Light Co.	14
Eastern Wis. Elec. Co., Chicago	5
Sioux Falls, So. Dak., Traction	5
Springfield, Mo., Traction Co.	2
Penna. & Ohio Elec. (Youngstown)	9
Gloucester Auto Bus Co. (Mass.)	9
B. & W. Passenger Service Inc., Conn.	3
Hart Bus Line, Mass.	8
Cleveland-Akron Bus. Co.	47
Geo. Rawding, Inc., Boston	5
Twin City Motor Bus, Minnesota	33
William H. Merz, Philadelphia	5
Youngstown & Ohio River R. R.	6
Los Angeles Motor Bus Company	121
Boulevard Transportation Co., Minnesota	18
Mesaba Transportation Co., Minnesota	10
Star Auto Stage, California	100
California Transit Company	120
Concourse Bus Line, Inc. (New York City)	3
Fred Harvery, Inc. (Grand Canyon)	20

*Gruss Air Springs now Standard Equipment on Fageols, Denbys, Morelands and used extensively on Whites, Macks, Maccars, Acmes, Garfords, Federals and many others.*

With such overwhelming evidence isn't it good business for you to investigate Gruss Air Springs at once? Our latest brochure "Why Bus Operators Re-Order Gruss Air Springs" gladly sent on request.

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THE CLEVELAND PNEUMATIC TOOL CO., Cleveland, O.

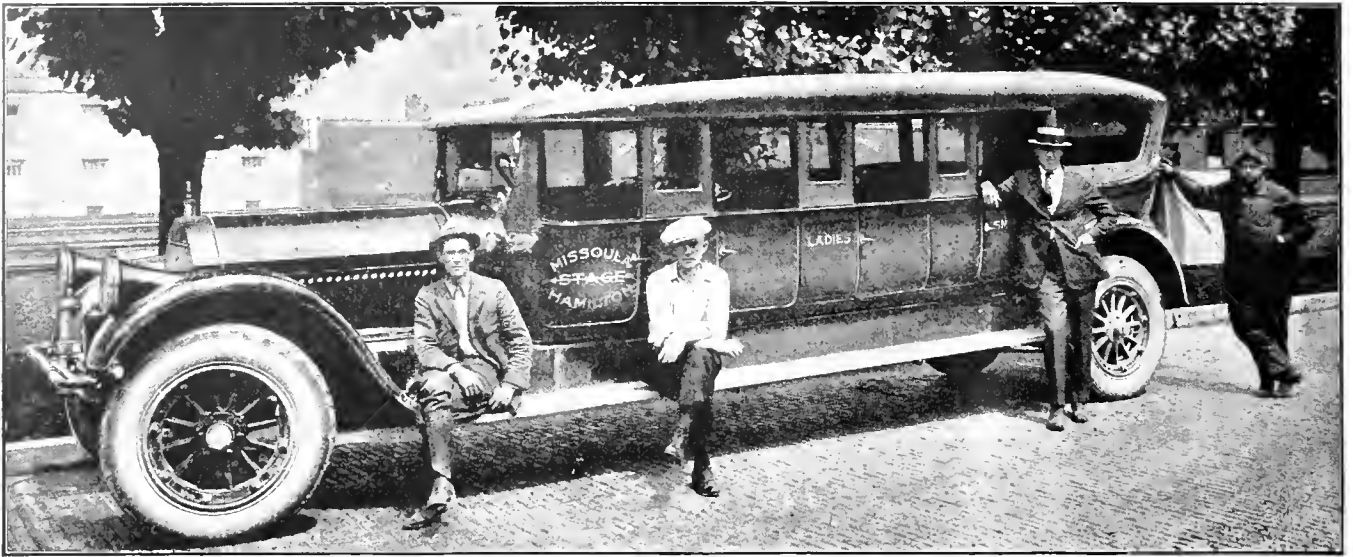
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# GRÜSS AIR SPRINGS

AS MANUFACTURED BY THE CLEVELAND PNEUMATIC TOOL CO

*Make all Roads  
Boulevards*





*The only thing for his work, says this Missoula, Mont., bus owner and driver, speaking of Lee Puncture-proof Pneumatics.*

## The Roads are Rough in Montana

DAILY, "Jack" Centers drives his Pierce-Arrow motor-stage a hundred and thirty miles over those rough Montana roads. And daily he looks at his Lee Puncture Proof Pneumatic Cords with a smile of approval. Five thousand miles without a puncture seems too good to be true. But that is only the beginning. He'll run thousands more.

Bus lines everywhere are equipping their vehicles with Lee Puncture Proof Tires, giving their patrons the comfort of riding on pneumatics and themselves the assurance of long and uninterrupted tire service. Would you be interested in knowing what Lee users near you say of this puncture-proof tire? Write us.

LEE TIRE & RUBBER COMPANY  
CONSHOHOCKEN, PA.

Executive Offices: 33 West 60th Street, New York

### THE ONLY COMPLETE TIRE LINE

Lee Puncture Proof Cord  
Lee Cord De Luxe  
Lee Standard Cord  
Lee Block-Tread Cord  
for Fords  
Lee Puncture-Proof Fabric  
for Fords  
Lee Standard Tube  
Lee White Tube De Luxe

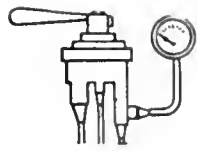
# LEE TIRES

"SMILE AT MILES"



From Montana to the Berkshire Hills is many a mile, but satisfaction with Lee Puncture Proofs is just as enthusiastic in both places. Here is 100% Lee-equipped fleet of buses plying between Albany, New York and Pittsfield, Mass.

Remember Lee by the Zig-Zag Tread—stops side skidding



## *To Facilitate Bus Operation*

THE braking problem has become the paramount issue in the automotive field, but a rapidly increasing number of bus owners have found that the problem is disposed of when Westinghouse Air Brakes are applied.

It is now generally conceded that the Air Brake is an important factor in successful bus operation, insuring maximum safety through short, smooth stops, and relieving the driver of all physical exertion in-so-far as the brakes are concerned.

The Air Brake as a protective feature is understood and appreciated by the riding public and its use will help you sell more rides.

*For further information write or wire*

Westinghouse Air Brake Company  
AUTOMOTIVE DIVISION  
General Office and Works: Wilmerding, Pa.



# WESTINGHOUSE

## AUTOMOTIVE AIR BRAKES



## *Where every trip tests tires and tire valves*

**P**NEUMATIC bus tires are constantly being put to the test in city traffic or on country roads. Their ability to stand up under unusual hardships and at the same time continue to retain air is proof of the tire-maker's skill in building them.

### **Tires depend on tire valves**

But every instance of pneumatic tire performance is a record for the tire valve as well. The life of your bus tires depends largely upon the ability of their tire valves to retain air. If the valves permit air to escape and your tires are run with too little air, you will soon pay the price in tire repairs and renewals. Maintenance costs rise a point or two higher and the operating efficiency of your busses drops.

### **Schrader Valves hold in air**

Schrader Universal Tire Valves are air-tight valves. They have been used in pneumatic tires since such tires were first made. Today

they are standard on practically all pneumatic tires made in the United States and Canada. Into every valve goes the experience of thirty years in making valves that retain air and help you get the greatest possible mileage out of motor bus tires.

### **Use complete Schrader Valve**

One thing is necessary, however, for keeping their maximum effectiveness—use of all the valve parts. The Schrader Valve Inside, Valve Cap, Rim Nut Bushing and Dust Cap—each has a separate and distinct duty to perform that helps to make the complete Schrader Valve for bus tires perform its function unflinching.

Rim nut bushings should be screwed down tightly against wheel rims, and valve caps and dust caps should be on tire valves before your motor busses leave the garage. This is one more step toward reducing your operating costs. Get these Schrader Tire Valve Parts from your supply house.

A. SCHRADER'S SON, Inc., Brooklyn, N. Y.  
Chicago      Toronto      London

# Schrader

Makers of Pneumatic Valves Since 1844

## Tire Valves • Tire Gauges

# BUILT OF *ROLLED* STEEL



## A Wheel that stands every test

**N**O wheel ever had to pass tests more severe than those to which the Bethlehem Rolled Steel Wheel was subjected.

First, searching laboratory tests, conducted both by truck builders and by ourselves, proved the ability of the Bethlehem Wheel to stand up under the most severe punishment that a wheel could receive.

Then—the results of these laboratory tests were confirmed, over and over again, by road tests, demonstrating finally and beyond question the

capability and stamina of the Bethlehem Wheel.

And, finally, it is the ruggedness and stamina of the Bethlehem Wheel, as established by these tests, that explain the success with which it is meeting the test of hard, every-day service.

**BETHLEHEM STEEL COMPANY**  
BETHLEHEM, PA.

Sales Offices in New York, Boston, Philadelphia, Washington, Pittsburgh, Detroit, St. Louis, Baltimore, Atlanta, Cincinnati, Cleveland, Buffalo, Chicago and San Francisco.

# BETHLEHEM

## ROLLED STEEL WHEELS

a useful  
gift



**D**EALERS now have sets of four or six Splitdorf Green Jacket Spark Plugs, the right type for every engine, packed in special Christmas boxes. For motorists who know that Splitdorf Plugs are worth more, these sets will prove a most pleasing gift.

#### Mica Insulation



Insulated with India Ruby MICA, the most perfect di-electric substance known and made with extra heavy electrodes—of course, they're worth more.

#### Unbreakable



Absolutely impervious to the effects of heat, cold, shock and vibration—of course, they're worth more.

#### Leak-proof



They're made gas and oil tight at the factory and thereafter every explosion in the cylinder makes them even tighter—of course, they're worth more.

#### Easy to clean



Being the most accessible plugs ever made, they are easily taken apart with two wrenches so—of course, they're worth more.

Splitdorf Electrical Company  
Newark, N. J.

Manufacturers of  
The Plug with the Green Jacket



## Attractive Window Posters to help you sell Splitdorf Green Jacket Plugs for Christmas Gifts

**D**EALERS who push the sale of Splitdorf Plugs in sets for Christmas gifts, will be supplied with attractively printed window posters describing this special Christmas offer.

This poster, a three-color enlargement of the Green Jacket Spark Plug advertisement that appeared in the December 1st issue of The Saturday Evening Post, displayed in the dealer's window will remind every passer-by of the merits of a set of Splitdorf Plugs as a Christmas gift.

Are you ready to take advantage of this big sales opportunity? If not, get in touch with your distributor or the nearest Splitdorf Branch.

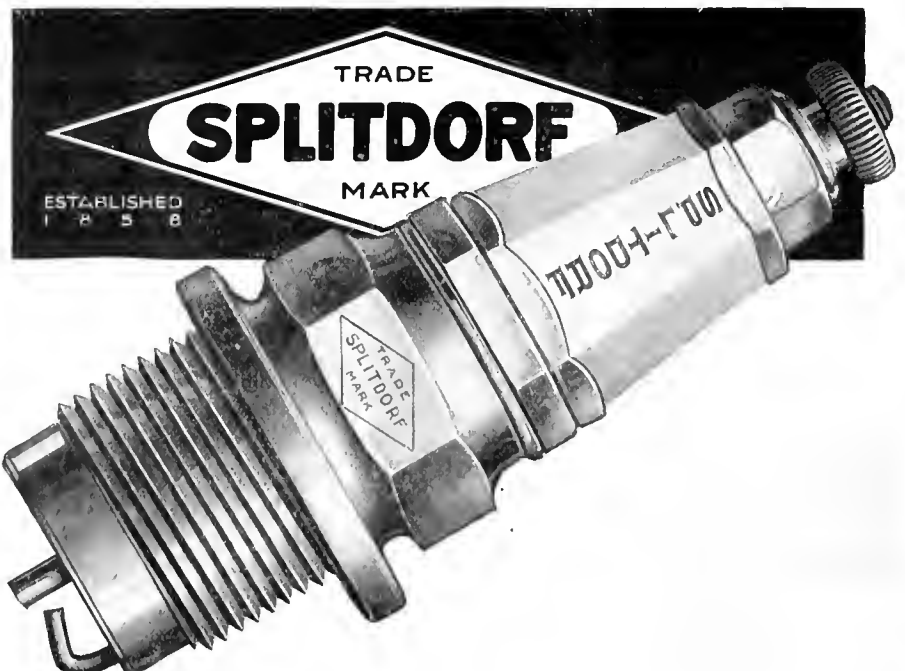
**SPLITDORF ELECTRICAL COMPANY**  
Newark, New Jersey

#### Sales and Service Branches:

ATLANTA . . . 10 E. Harris St.  
BOSTON . . . 52 Brookline Ave.  
CHICAGO . . 2900 S. Michigan Ave.  
DETROIT . . 935 W. Warren Ave.

PHILADELPHIA . 222 N. 22nd St.  
PITTSBURGH, 5943 Ellsworth Ave.  
SAN FRANCISCO . 1452 Bush St.  
TORONTO . . . 490 Yonge St.

NEW YORK . 1755 Broadway







miles!

miles!

miles!

## Are you tired of tire expense?

Quite a strain, isn't it, when those big bus tires give out? You had hoped they would go at least another month or two.

Why not join the growing list of bus operators using Armstrong Pneumatics—the longer service kind. These are the tires which have been known to do 40,000 miles with scarcely a sign of wear. These are the tires used by more than 25% of all the buses in Newark, N. J.

*For lowest annual tire expense,  
standardize on Armstrong's*

*Direct to user at  
lowest cost*

*If there is no Armstrong  
dealer in your locality, write  
to us for direct quotations.  
We'll give you the advan-  
tage of the dealer's dis-  
count.*

**The Armstrong Rubber  
Company, Inc.**

361 Seventh Avenue, New York

Factory—West Haven, Conn.

Chicago Office—1223 So. Wabash Ave

Seattle Office—Fox Armstrong Tire Co., 925 Pike St

# ARMSTRONG TIRES

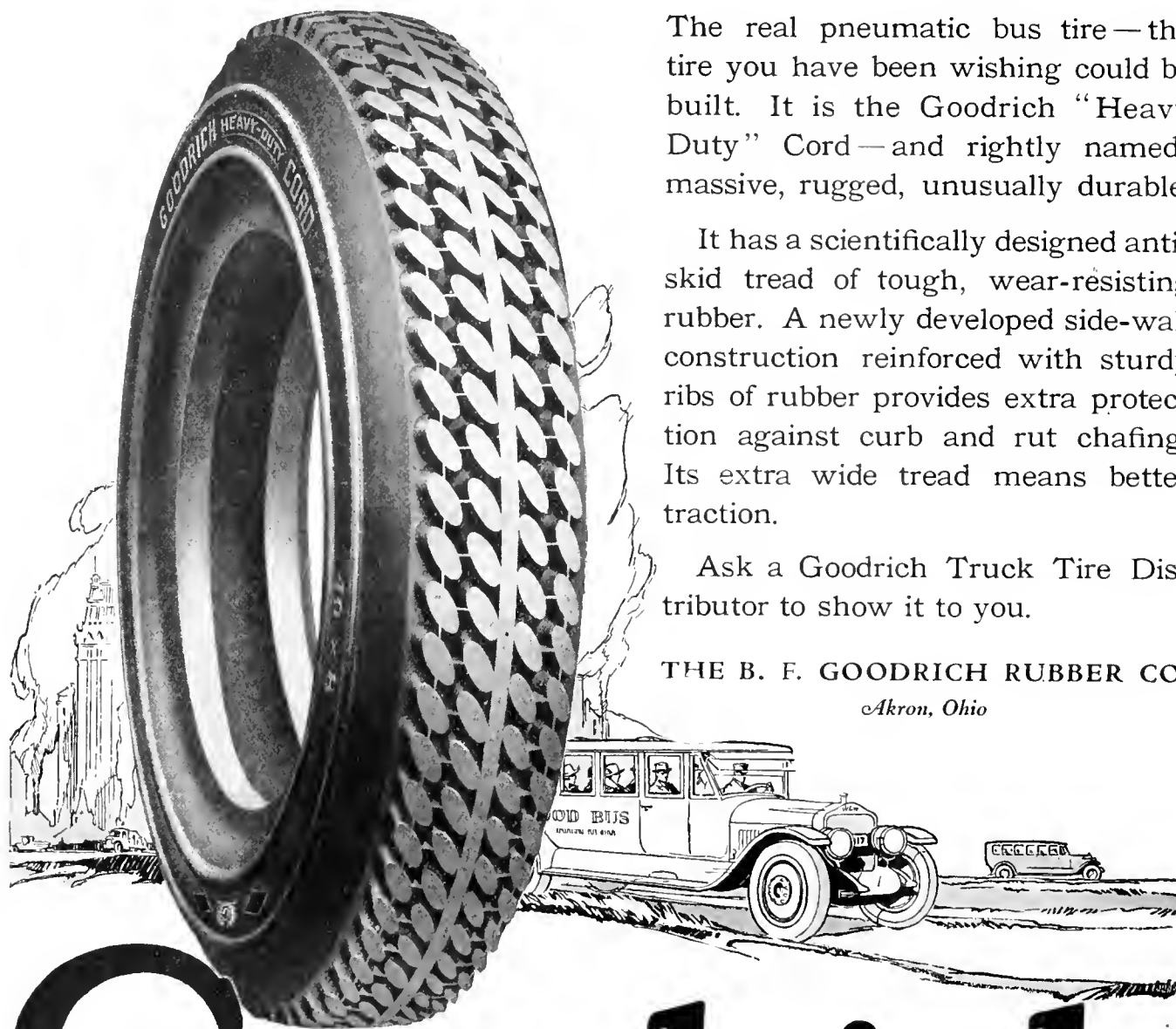
# *More WORK and more PROFIT* *from your Tire Equipment*

The real pneumatic bus tire — the tire you have been wishing could be built. It is the Goodrich "Heavy Duty" Cord — and rightly named; massive, rugged, unusually durable.

It has a scientifically designed anti-skid tread of tough, wear-resisting rubber. A newly developed side-wall construction reinforced with sturdy ribs of rubber provides extra protection against curb and rut chafing. Its extra wide tread means better traction.

Ask a Goodrich Truck Tire Distributor to show it to you.

THE B. F. GOODRICH RUBBER CO.  
*Akron, Ohio*



# Goodrich

## Heavy-Duty CORD

*"Best in the Long Run"*

# TIMKEN

## Ready for the Traffic

For a quarter-century Timken axle-engineering has anticipated the needs of motor vehicle development in advance of actual requirement. This has already been true of the passenger car, commercial car, motor truck, taxi and tractor.

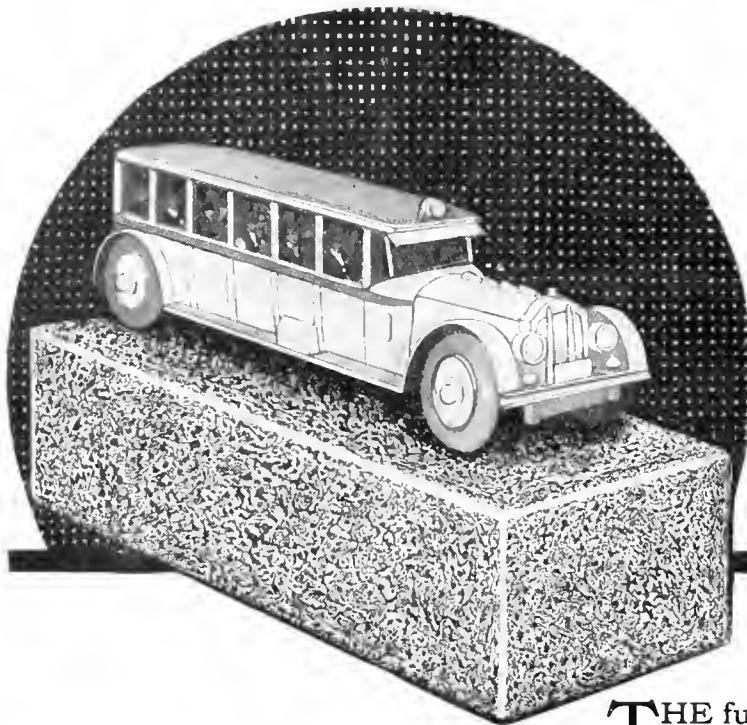
Tendencies in modern motor-bus construction again vindicate the Timken principles of axle-building—safety, durability and engineering co-operation.

Our service engineers will be glad to discuss your axle equipment without obligation to you.

THE TIMKEN-DETROIT  
AXLE COMPANY  
Detroit, Michigan



# AXLES



# The Bus and The Brick

THE future of the motor bus is closely tied to the problem of paving. First because public sentiment mistakenly believes that the bus is one of the greatest factors in damaging pavements. Second because bus operators realize that smooth pavements and reasonable road taxes are vital to continued growth and profits.

The bus owner, more than any other citizen, is vitally interested in seeing that his community gets *enduring* pavements which give *long service without "eating their heads off"* for upkeep. Poor pavements punish both his patronage and his profits, swell his operating costs, expand his taxes and create public criticism of busses for alleged damage to roadways.

The one pavement which, at reasonable first cost, gives longest service at minimum after-cost for maintenance and repairs is the *modern vitrified brick pavement*.

*Do you want proof? Do you want to see actual facts and figures from official public records showing how taxes are increased by substitute paving materials and held down by vitrified brick pavements?*

*If so, just let us know as the figures are waiting here to mail to you.*

VITRIFIED  
**Brick**  
**PAVEMENTS**  
**KEEP TAXES DOWN**

NATIONAL PAVING BRICK MANUFACTURERS ASSOCIATION, ENGINEERS BLDG., CLEVELAND, OHIO

Albion Shale Brick Company  
Albion, Ill.  
Alton Brick Company  
Alton, Ill.  
Barr Clay Company  
Streator, Ill.  
Binghamton Brick Company  
Binghamton, N. Y.  
Cleveland Brick & Clay Company  
Cleveland, Ohio  
Clydesdale Brick & Stone Co.  
Pittsburgh, Pa.  
Coffeyville Vitrified Brick & Tile Co.  
Coffeyville, Kans.  
Collinwood Shale Brick Company  
Cleveland, Ohio  
Corry Brick & Tile Company  
Corry, Pa.  
Francis Vitric Brick Company  
Boynton, Okla.

Georgia Vitrified Brick & Clay Co.  
Augusta, Ga.  
Globe Brick Company  
East Liverpool, Ohio  
Hammond Fire Brick Company  
Fairmont, W. Va.  
Hocking Valley Brick Company  
Columbus, Ohio  
Independence Paving Brick Co.  
Independence, Kans.  
Mack Mfg. Company  
Wheeling, W. Va.  
C. P. Mayer Brick Company  
Bridgeville, Pa.  
Medal Paving Brick Company  
Cleveland, Ohio  
Metropolis Paving Brick Co.  
Pittsburg, Kans.  
Metropolitan Paving Brick Co.  
Canton, Ohio

Mineral Wells Paving Brick Co.  
Mineral Wells, Texas  
Moberly Paving Brick Company  
Moberly, Mo.  
Murphysboro Paving Brick Co.  
Murphysboro, Ill.  
Patton Clay Mfg. Company  
Patton, Pa.  
Peebles Paving Brick Company  
Portsmouth, Ohio  
Pittsburg Paving Brick Company  
Pittsburg, Kansas  
Perrinton Paving Brick Company  
Galesburg, Ill.  
Southern Clay Mfg. Company  
Chattanooga, Tenn.  
Springfield Paving Brick Company  
Springfield, Ill.

Sterling Brick Company  
Olean, N. Y.  
Streator Clay Mfg. Company  
Streator, Ill.  
Thornton Fire Brick Company  
Clarksburg, W. Va.  
Thrasher Brick Company  
Ft. Worth, Texas  
Toronto Fire Clay Company  
Toronto, Ohio  
Trinidad Brick & Tile Company  
Trinidad, Colo.  
Veedersburg Paver Company  
Veedersburg, Ind.  
Western Shale Products Company  
Fort Scott, Kans.  
Westport Paving Brick Company  
Baltimore, Md.



## SERIAL NUMBERS

# BROWN-LIPE GEAR SERIAL NUMBERS —Your Safeguard

YOU may find the serial numbers sometimes painted over but they are stamped on all Brown-Lipe Gear units as follows:

**Unit Power Transmissions**—On the forward top side of the case, to left of center and either under or immediately in front of the cover; also on top of the cover near the left edge.

**Main Frame Transmissions**—On the top surface of the left rear supporting arm; also on top of the cover, near this arm.

**Clutches**—On top of the left side boss for the release shaft.

**Controls**—Unit power type, on top of the cover, near center. Main frame type, on edge or top of the bracket.

Never use anything but Genuine parts with Brown-Lipe Gear units.

Service may be obtained from manufacturers using our units, authorized parts service stations or direct from our factory.



## BROWN-LIPE GEAR COMPANY

SYRACUSE, N. Y.

San Francisco

Chicago

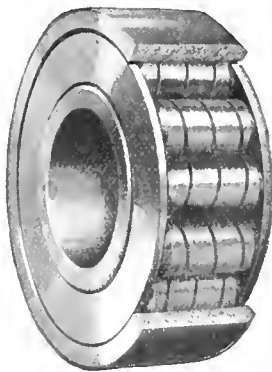
Detroit

New York

London, Eng.



## Write Today for These Three Bulletins on the Hyatt New Series Roller Bearing



Every automotive executive, engineer and draftsman should have in his possession copies of these three bulletins on the Hyatt New Series Bearing. This conveniently bound information is practically indispensable for those responsible for bearing applications.

The bulletins consist of "Data Sheets on Bearings for Motor Cars and Trucks"—"Design Sheets on Transmissions for Passenger Cars"—"Design Sheets on Axles for Passenger Cars."

These three bulletins will be gladly forwarded upon request. In order to have your data files complete, write for these bulletins today.

### HYATT ROLLER BEARING COMPANY

Newark	Detroit	Chicago	San Francisco
Worcester	Milwaukee	Huntington, W. Va.	Minneapolis Philadelphia
Cleveland	Pittsburgh	Buffalo	Indianapolis

# HYATT

Quiet

## Roller Bearings





Most everyone in the industry, we sincerely believe, has long been familiar with the magnitude and scope of the Waukesha Motor Company's experimental resources.

Its contributions have been recognized and accepted as engineering developments that were sound, practical and mature, for they have made the name a tradition for heavy duty motor supremacy.

Its latest presentation—the Waukesha Bus and Truck Motor—has added not a little to the significant position of its builders, for only an organization so adequately qualified could have developed a transport motor so extraordinarily fine, so outstandingly efficient.

Its great durability is a proven thing. Its economies unparalleled.

## **The WAUKESHA MOTOR COMPANY, Waukesha, Wisconsin.**

*The World's Foremost Builders of Bus, Truck, Tractor and Industrial Motors Exclusively*

### **SALES OFFICES:**

1824-1825 Aeolian Bldg.,  
33 W. 42nd St., New York  
Telephone: Longacre 5784

503-505 Capitol Theatre Bldg.,  
Madison Ave. Side, Detroit  
Telephone: Cadillac 4482

*Ready for you!*

August, 1923, Edition

# McGRAW Electric Railway Directory

*with* NEW FEATURES

New data regarding number of buses owned  
List of bus lines controlled by electric railways

New indexing to show what lines connect any cities or towns in which you are likely to be interested.

New listing of holding companies (cross indexed).

*plus*

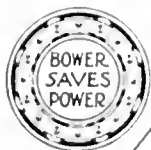
- |   |  |   |
|---|--|---|
| 1. A complete list showing the correct name of every recorded electric railway company in the United States, Canada, Mexico and the West Indies, arranged by States and Cities. | 9. Number and make of generators, starting capacity, voltage, whether d.c. or a.c., and if a.c., phase and cycles. | 20. Gauge of track.   |
| 2. Address of each company.   | 10. If water power is used, horsepower and make of prime movers.   | 21. Number and kind of rolling stock used.  |
| 3. Names of affiliated and controlling corporations.  | 11. If steam power is used, horsepower and make of boilers and engines.  | *22. Number of one-man cars.  |
| 4. Names of principal communities on routes.  | 12. If gas or oil engines are used, horsepower and make.   | *23. Rate of fares.   |
| 5. Names and addresses of corporation officers and principal department heads, including purchasing agents.   | 13. Transmission voltage.  | 24. Doing a lighting business.  |
| 6. Names and addresses of holding or controlling companies and lists of properties controlled by each.  | 14. Trolley voltage.   | 25. Date of latest information.   |
| 7. Names and addresses of consulting engineers, if any.   | 15. If energy is purchased, from whom.   | 26. Names, officers and executive committees of Electrical Railway Associations, arranged alphabetically by name.                                   |
| 8. Addresses of power plants and repair shops.  | 16. Number and capacity of sub-stations, number of rotary converters and motor generator sets used.                | 27. Names, commissioners and principal assistants of National and State Railroad and Public Utility Commissions, arranged alphabetically by States. |
|   | 17. Amusement parks reached, whether owned or controlled by company.   | 28. Statistics showing growth of the industry.  |
|   | 18. Mileage of the road, owned, leased and trackage rights.  | 29. Alphabetical list of Electric Railway Officials, indexed for company connections.   |
|   | 19. Miles in paved streets.  | 30. Alphabetical index to companies.  |

*No change in price*

\$5.00 per copy. \$9.00 per year for two successive semi-annual issues. Order now!

*Directory Department*

McGRAW-HILL COMPANY, INC.  
Tenth Avenue at 36th Street, New York



# ROLLER BEARING CO.

## Detroit · Michigan

Bower popularity is gaining every day. This without question must be due to the correct fundamental Bower designs and the exclusive Bower features.

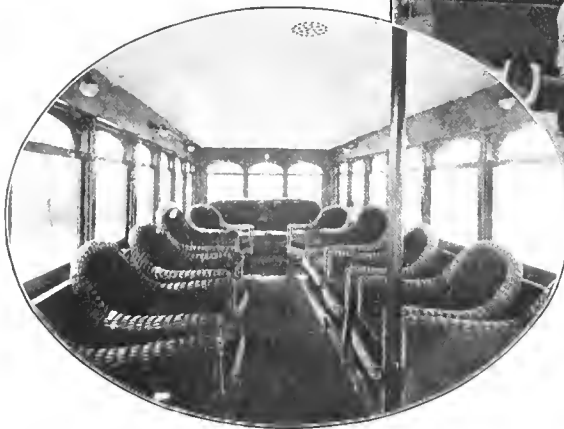
### Exclusive Bower Features

Separate bearing surfaces for load and thrust. Parallel raceways. Self-aligning. Never need adjusting. Does not develop end-thrust under loads. Will not bind or



# Roofed with HASKELITE PLYMETL side panels

*Operated by  
Youngstown & Suburban  
Transportation Co.*



*Kuhlman De Luxe Bus  
with HASKELITE roofs  
and PLYMETL sides.*

***Who wouldn't want to  
ride in these coaches?***

These coaches have stability, strength and safety *as well as* attractive appearance. They introduced a new type of De Luxe Chair Motor Coach made by the G. C. Kuhlman Car Co.

And because the Kuhlman Co. knew from extensive experience the special merits of HASKELITE, these coaches are roofed with HASKELITE. Notice the attractive, highly finished ceiling, as shown in the interior views above. This is simply the underside of the HASKELITE roofing. This HASKELITE unit construction not only makes HASKELITE the most attractive roof made, but on account of being moulded it

acts as a strong arch tying together the body side pillars, making for strength and rigidity.

PLYMETL side panels have been used in these De Luxe Coaches, PLYMETL, the siding with an interior of wood and exterior of steel, will protect these coaches against cold, heat, and the wear and tear of service. Coaches with PLYMETL side panels are always kept warmer in winter and cooler in summer. PLYMETL side panels give the endurance of steel with far less dead weight.

*Write for booklets describing HASKELITE and PLYMETL. These booklets include the experience of expert bus body builders, photographs, blue prints, etc.*

**HASKELITE MANUFACTURING CORPORATION**  
133 W. Washington St., Chicago, Ill.

## **FAGEOL** **SAFETY COACH**

# Making Larger Profits

There can be little question about the fact that the Fageol Safety Coach is more profitable to operate, when you consider the number of large bus-operating companies in the East, formerly standardized on eastern buses, who are now buying Fageol Safety Coaches exclusively.

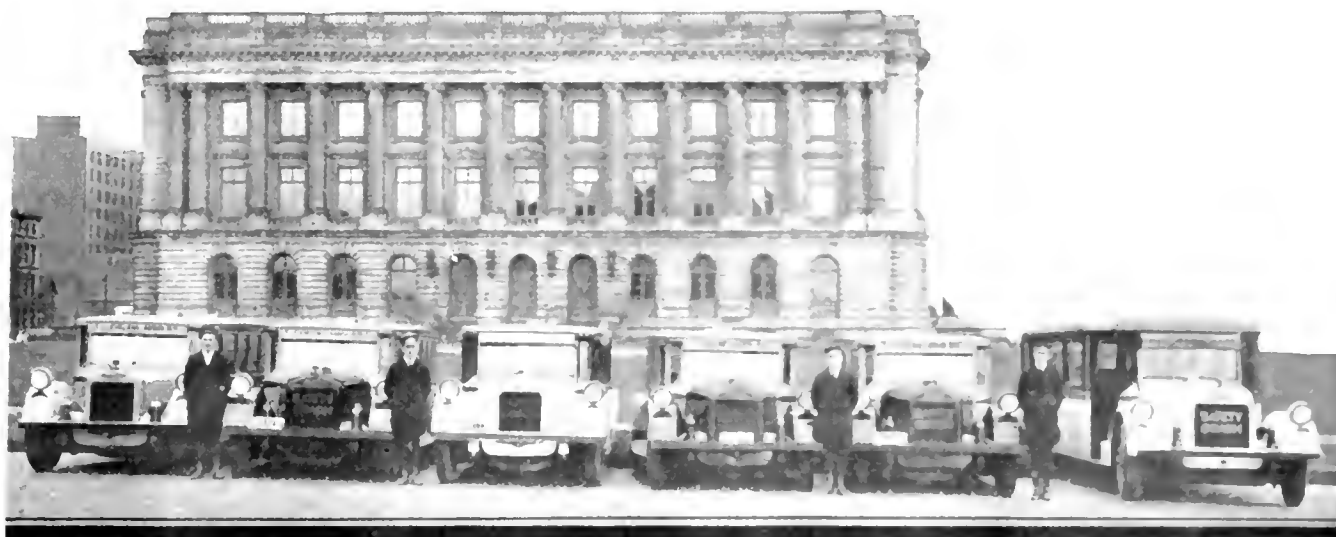
The Cleveland-Akron Bus Company, one of the largest of these companies, recently bought a dozen Inter-City Model Fageol Safety Coaches. They could have bought locally-made buses like they formerly used, for less money per bus—but they were interested in getting greater profits per dollar.

The unmistakable safety, the greater comfort, the refined appearance, and the dozen features which make the passenger feel that he is better cared for, give the Fageol Safety Coach a passenger-attracting quality that puts it in a class by itself.

Ask us to tell you how YOU can get more profit by operating Fageol Safety Coaches.

**FAGEOL MOTORS COMPANY**  
107th Ave. and Hollywood Blvd.,  
OAKLAND, CALIFORNIA

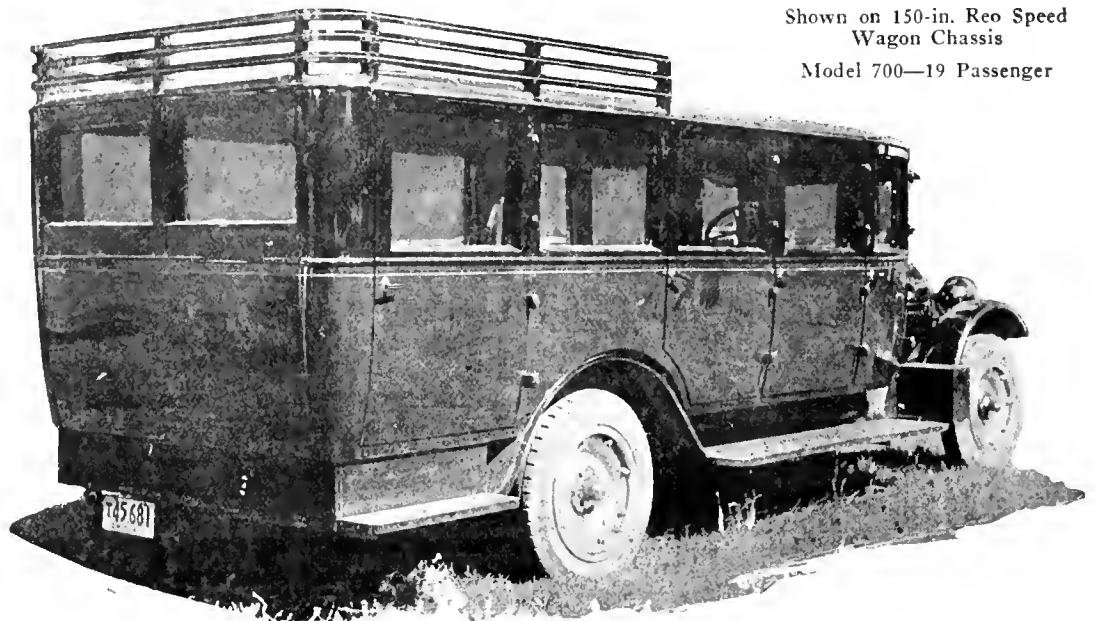
**FAGEOL MOTORS CO. OF OHIO**  
409 Bulkley Building,  
CLEVELAND, OHIO



# "Fremont" Coach

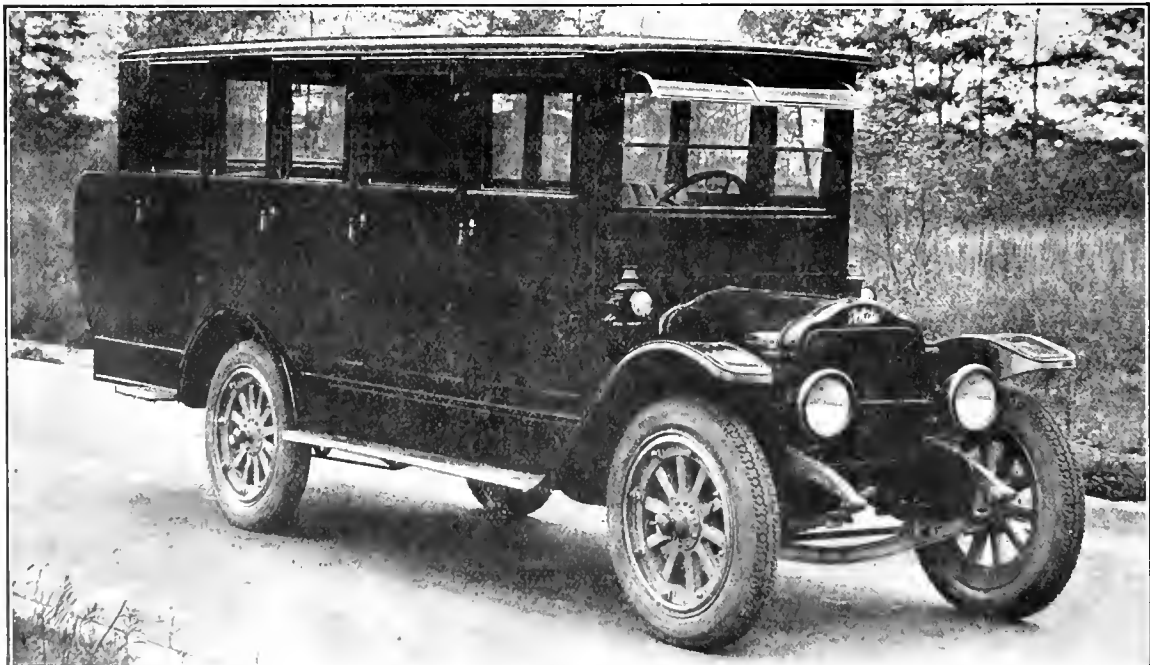
Shown on 150-in. Reo Speed  
Wagon Chassis  
Model 700—19 Passenger

A low clean-cut Stream Line Body, just what you have been looking for on a Reo chassis. Write today for specifications and prices.



**The Fremont Metal Body Co., Fremont, Ohio**

## McKAY Sedan Bus Body



No. 214

This Bus is built low, and is designed for comfort and easy riding; can be furnished with or without special baggage rack in rear. *Write for particulars.*

Distributing Branch  
Lansing Bus Co.,  
Lansing, Mich.

The Best Built and Finished Body of Its Kind on the Market at the Price

**McKAY Carriage Company, (Established 1867) Grove City, Pa.**



# WANTED!

## More Buses—More Bodies—More Equipment

**F**IFTY thousand or more already in the field! A vital industry! A growing industry! A means of transportation the public wants! This past year—1923—all records for bus activity have been broken. Thousands of motor-bus operators have increased their motor-bus equipment more than 100%.

Do you want to sell buses in 1924? Do you want to help satisfy the demand for more bodies and better bodies? Have you accessories, parts supplies or equipment to offer?

All indications point toward a bigger year in 1924 than ever before in the motor-bus industry!

## Bus Transportation

will bring your business before the buyer

Bus Transportation is the original 100% motor-bus publication in the field. It is read by independent bus-line owners and operators, electric railway officials who operate or contemplate the operation of buses, and manufacturers and dealers selling their products to the motor-bus industry. It provides the most economical means for reaching and influencing the buying habits of this market.

Resolve now—begin the new year right—with an advertisement in the Annual Review and Forecast Number of Bus Transportation. Find out for yourself that Bus Transportation readers buy from Bus Transportation advertisers.

*Reserve Space at Once*

*in the*

ANNUAL REVIEW AND FORECAST NUMBER  
APPEARING JANUARY 1924.

# Increase Your Winter Bus Traffic

**Y**OUR passengers want to ride in comfort—and in winter that means **HEAT**. Cold, disgruntled passengers will forsake you at the first sign of competition, if the other fellow has heat. And if you operate trolley feeders the comparison between the warm trolleys and a cold bus will be all the worse for you. Don't wait for competition.

## Features

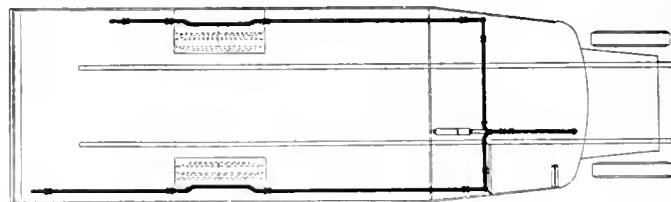
Ample Heat. Low-priced complete system. Seamless steel tubing.

Smooth joints and angles. Clothing guards.

No odors. No smoke. No danger to passengers.

## Some Users

Ace Motor Co.  
Camden County, N. J.  
Bus Association,  
Fifth Avenue Coach Co.  
International Harvester Co.  
International Motor Co. (Mack)  
Phila. Rapid Transit Co. (for Buses)  
Yellow Coach Mfg. Co.



## Install a Petry Bus Heating System

Makeshift systems, home-made out of ordinary iron pipe, can not be compared with the scientifically made-to-measure Petry Bus Heating System. Seamless drawn steel tubing, much lighter than ordinary iron piping, plus the scientific design of the Petry System, eliminate choking, leaking, back pressure, over-heating of the motor and loss of power. The Petry Tuning-Up Valve helps you keep your motor fit and reduces your bus depreciation. And the first cost is the last.

**N. A. PETRY COMPANY, Inc.**

321 N. Randolph Street, Philadelphia, Pa.

*Makers of Tuning-Up Valves, Pedals, Hand Levers, Tire Pumps, Twinlock Tire Carriers and Dash-Controlled Tuning-Up Valves*

Western Distributor: Norman Cowan Co., 445-51 Rialto Bldg., San Francisco, California

# The PETRY Bus Heating System

Reg. in U. S. Pat. Off.



**41,700 Miles**  
**on an M & M Bus**  
of Camden, N. J.

**Princeton Giant Cords**

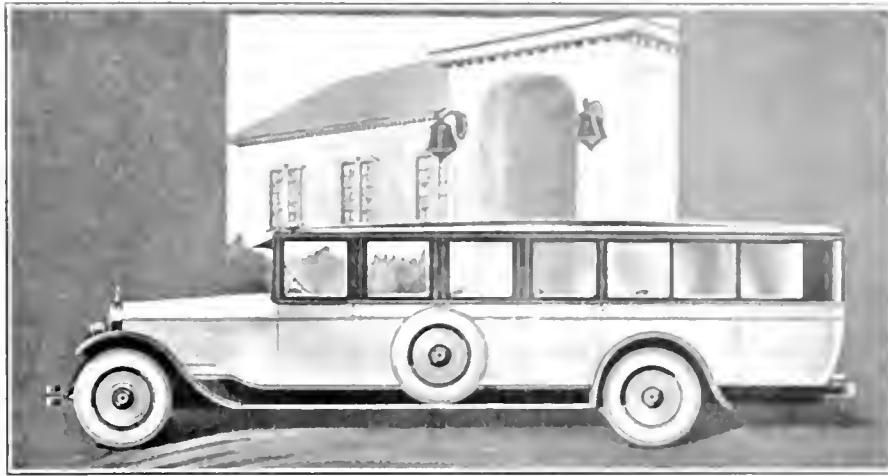
**Will Give You More Mileage  
for Less Money**

For truck users we have a wonderful  
"Prove or No Pay" test tire offer.

Write us

**Princeton Tire & Rubber Company**  
Trenton, N. J.

## The LANG 21-Passenger Sedan



OFFERING every convenience and comfort, the Lang 21-passenger sedan combines the ultimate in pleasure with classic simplicity and beauty of line, distinctiveness and serviceability.

*This model is available for delivery now.*

*The* **LANG BODY COMPANY**  
CLEVELAND, OHIO



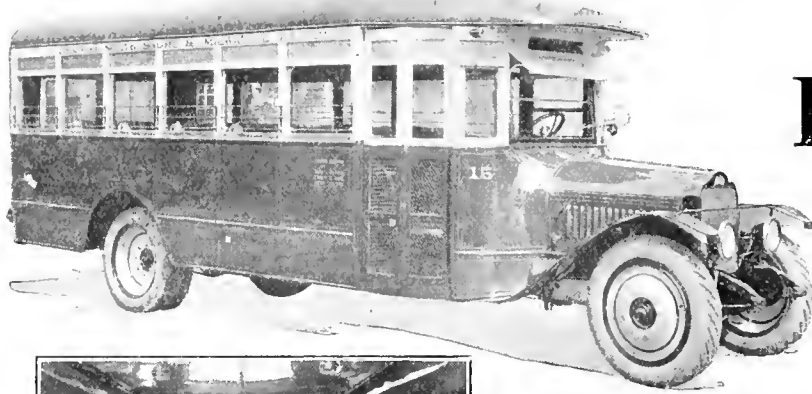
## Champion De Luxe Bus Bodies

For efficiency in design, stability of construction and economy in upkeep Champion De Luxe Bus Bodies have no superior. They offer the utmost in comfort to passengers, together with attractive appearance.

The Champion De Luxe Body illustrated above carries 25 passengers. The outside construction is of aluminum with interior of wood panels and paneled ceiling.

*Let us send complete details*

**Champion Auto Equipment Co.**  
Hammond, Indiana



An organization that builds standardized quality bodies on a quantity basis.

# Built By Kastory

**Y**OU can always identify Kastory Bus Bodies by the excellence of the body lines and on closer inspection by the quality of the workmanship and the materials used.

## KASTORY MANUFACTURING CO.

*Commercial and Motor Bus Body Builders*

301-311 Hillgrove Avenue, LaGrange, Ill.

### LEADERSHIP QUALITY **EDWARDS** SERVICE SINCE 1887

**P**RESTIGE for your bus line, and a desire to ride in your buses by increasing numbers of passengers are largely built upon the degree of comfort and safety which is built into your equipment.

## EDWARDS Bus Fixtures

--are made by manufacturers who do not feel that their responsibility ends until their products give the riding public complete satisfaction and comfort.

### EDWARDS PRODUCTS

Window fixtures	Metal stop casings and parting stops
All metal sash balances	Top, bottom and side weather stripping
Sash locks and racks	Steel vestibule trap doors
Sash lifts	Trap door locks and latches
Anti-rattle compression devices	

The **EDWARDS** Co. Chicago, Ill.  
Canadian Representative:  
Lyman Tube and Supply Co., Ltd., Montreal and Toronto



## UNIFORMS

We supply uniform equipment to leading

### *Transportation Companies*

D. L. & W. R. R. Co.  
Hudson River Day Line  
Fifth Avenue Coach Co.  
Chicago Motor Coach Co.  
Peoples Motorbus Co.

### *Hotels*

Biltmore (New York)  
The Plaza (New York)  
Commodore (New York)  
Belmont (New York)

Biltmore (Providence)  
Breakers (Palm Beach)  
U. S. Hotel (Saratoga)  
Kimball (Springfield)

### *Banks*

Guaranty Trust (New York)  
Mechanics & Metals Nat'l Bank  
(New York)

Coal & Iron Nat'l (New York)  
Perth Amboy Trust

Designer of the Summer Blouse, Dress Coat and Winter Overcoat for the New York Police Department.

JOSEPH F. WEBBER  
273 Fifth Avenue, New York, N. Y.

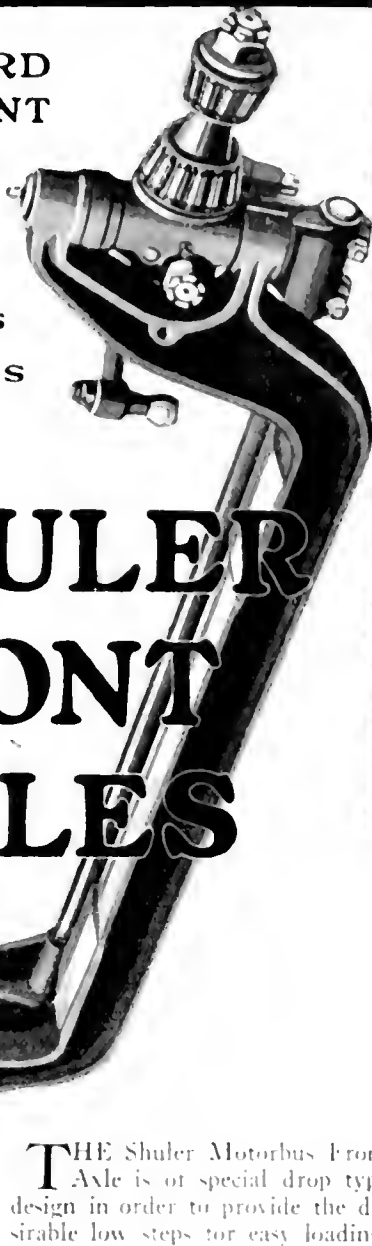
Established 1896

## JOSEPH F. WEBBER

## STANDARD EQUIPMENT

for  
MOTOR  
BUSES  
MOTOR  
TRUCKS  
TRAILERS  
and  
TRACTORS

# SHULER FRONT AXLES



**T**HE Shuler Motorbus Front Axle is of special drop type design in order to provide the desirable low steps for easy loading, a low wide body floor, a low center of gravity, and at the same time ample road clearance. It is heavy and sturdy—made to satisfy completely in safety and service—both of which are vital in motorbus operation.

All the energies of Shuler experienced engineers and Shuler skilled mechanics have been concentrated on the developments and perfection of Shuler Front Axles. It is only reasonable to expect that such specialization would result—as it has—in a distinctly superior product, a front axle of higher efficiency in service and that will stand up under any emergency.

*If you are looking for this kind of a front axle, we will be glad to give you further information together with the fullest kind of co-operation from our engineers.*

**SHULER AXLE COMPANY, Inc.**  
3007 Jones Street, Louisville, Kentucky, U. S. A.



## You Can Be Sure With Goodyears

"We have had as high as 30,000 miles from Goodyear Cord Truck Tires on our buses operating in the Minneapolis territory. With this equipment we are always sure there will be no delays on the road; always sure that our passengers will have a comfortable ride."—THE INTERSTATE TRANSPORTATION COMPANY, Minneapolis, Minnesota

Of certain things you can be sure when you equip your buses with Goodyear Cord Truck Tires —

Sure of close-clinging, hard-gripping, All-Weather Tread traction on any road.

Sure of trouble-free, on-time operation.

Sure of safety, easy riding and comfort for your passengers.

Sure of economical cushioning for your valuable equipment — lower repair bills, less time out for overhauls.

Sure of thousands of miles of genuine Goodyear service at low tire cost per mile.

Goodyear Means Good Wear

# GOOD YEAR

Goodyear makes the type of tire for every hauling condition—Cords, Cushions and Solids with the famous All-Weather Tread, and smooth-surfaced Solids, also. Goodyear Truck Tire Service Station Dealers everywhere give standard Goodyear Service to bring out of the tires every mile built into them at the factory.

## What is your driver's health worth to you?



How long will a good driver last, working long hours, and subject to the continual vibration, shaking, and jolting that are met with in motor bus service? Not long, that's sure! Bus operators everywhere are beginning to wonder about his problem. They realize that aside from the human side, it represents a money loss to them every time they lose an experienced driver.

### Every new man costs money

You have to train him, he misses fares, he has accidents, makes mistakes, loses time on his runs and in many ways makes you wish you had been able to keep the experienced men.

### Save the experienced man—it pays!

Parker Pneumatic Bus Seats help to solve the problem. They are built to absorb all the road shocks and vibrations. They make riding a pleasure because you ride on air. Invest \$32.50 in a Parker Pneumatic Driver's Seat. You will more than be repaid for the amount you invest.

Parker Pneumatic Bus Seats are made in various styles for both passenger and driver accommodation. Write for details.

**Parker Pneumatic Bus Seat Co.,**  
282 Straight St., Paterson, N. J.

## LEECE-NEVILLE

12 Volt Lighting Systems for Motor Busses

*will protect your revenue*

EXPERIENCED operators know that LEECE-NEVILLE Lighting Systems are as much a factor in building up revenue as poorly-lighted busses are a factor in keeping it down.

LEECE-NEVILLE provides not only abundant illumination, but a system designed especially for motor bus service, having ample capacity and automatically providing for the difference in current between day and night operation.

LEECE-NEVILLE also provides absolute reliability, preventing lapse of service or loss of revenue, and insuring safety.

Insist upon LEECE-NEVILLE Electrical Equipment. It combines the highest standards of engineering and quality. Nothing less will protect your revenue.

**The Leece-Neville Company,**  
Cleveland, Ohio

SIDE SEAT BODIES

CROSS SEAT BODIES

**"BETTER BUILT" BUS BODIES"**

**FIRST-QUALITY** materials and workmanship are built into our sturdy, distinctive Bus Bodies. Quantity production of standardized units enables us to offer them at extremely moderate prices. You dealers will find these high-class, low-priced bodies powerful aids in closing bus sales.

*Complete Catalog and Prices  
Gladly Sent on Request*

**BUS BODY CORPORATION**  
BETTER BUILT BUS BODIES  
EVANSVILLE INDIANA



# SWINEHART

30 x 3½

T. N. T. (Non-Skid)

## CUSHION TIRES



**T**HEY are designed and constructed to give satisfaction and comfort on the passenger car as well as on the light delivery truck. For the closed car they are ideal equipment assuring satisfaction, comfort and absolute safety.

### *They Wear and Wear and Wear*

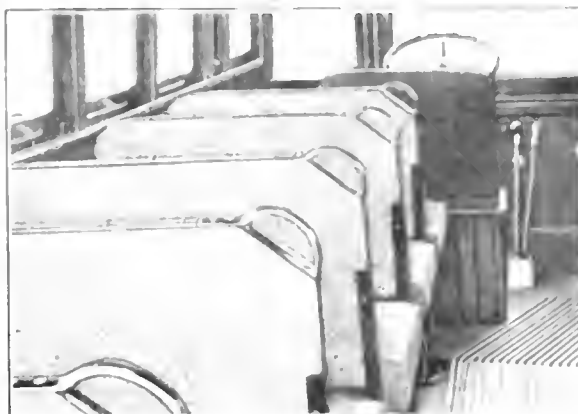
The peculiar construction together with the well-known Swinehart Quality, assures a mileage that is altogether out of proportion to the low prices of THE SWINEHART CUSHION TIRE.

They give absolute satisfaction, no punctures or blow-outs, no bothering about maintaining proper inflation, nothing but lots of mileage and comfort. Built on Standard Demountable Rims, they will fit *any demountable wheel without alterations*. Simply take the old tire off and put on the Swinehart Cushion.

You will be interested in the Swinehart dealers proposition. Write for additional information today.

THE SWINEHART TIRE & RUBBER CO.  
Akron, Ohio

*Heywood-Wakefield.*  
REG. U.S. PAT. OFF.



## 7 Advantages in HEYWOOD-WAKEFIELD CROSS SEATS

- 1 Pressed steel frame—light and strong.
- 2 Wide flange on pedestal base—more bearing surface and better fastening facilities.
- 3 Wide yoke on pedestal—better support for cushion.
- 4 Strong, substantial wall bracket.
- 5 Bracket fastening top of back to body giving stability to back.
- 6 Roomy, deep cushions with spring edge.
- 7 More aisle room through off-set backs. (For passengers who happen to be standing.)

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Heywood-Wakefield Company  
Factory, Wakefield, Mass.

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*Heywood-Wakefield.*  
REG. U.S. PAT. OFF.

# DIXON'S 677



Dixon's 677 may be obtained in steel drums with pump, providing a quick, clean means of lubricating gear-boxes. A necessity in every garage and service station. Write for quotation.

It has been ascertained by tests that Dixon's Gear Lubricant No. 677 gives as good service at freezing temperatures (winter conditions) as at higher temperatures (summer conditions.)

When it is taken into consideration that an automotive transmission and differential has to meet this wide temperature difference, and especially when lubricated with the average gear oil that congeals at low temperatures, making gear shifting extremely difficult, the actual power losses are easily apparent. Dixon's 677 prevents such losses.

*Write for Booklet No. 159-G*

## JOSEPH DIXON CRUCIBLE COMPANY

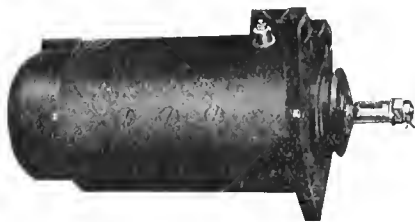
Jersey City, N. J.



Established 1827

Makers of Quality Lubricants

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North East Model LL 225 Watt Generator

The new North East Model LL Generator has a diameter of 5 1/4" and a capacity of 225 Watts. With the addition of this model, North East Generators are now available for every service requirement from 125 Watts to 600 Watts.

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ROCHESTER, N. Y., U. S. A.

*Official Service by*

### NORTH EAST SERVICE INC.

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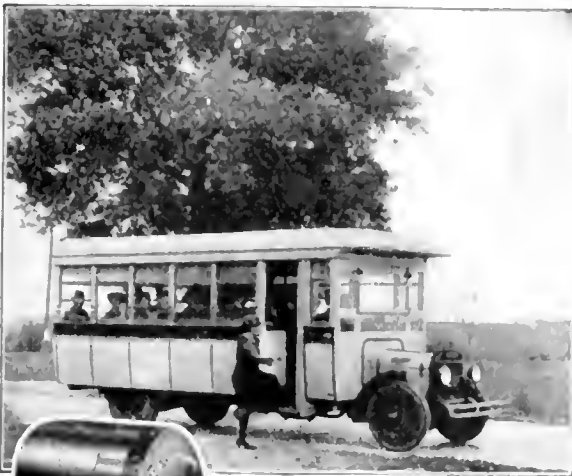
## BUS OPERATORS FIND INCREASING USE FOR KASS SAFETY TREAD

FOR BUS STEPS AND  
CAB INTERIORS. RETAIN  
THEIR NON-SLIP FEATURE  
THROUGH YEARS OF USE



Write for  
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Master Motors Corporation Bus,  
Eisemann Equipped



## Maintaining the Schedule!

An important factor in creating a favorable impression upon the public mind.

A dependable ignition system contributes greatly to uninterrupted bus service, and the rugged construction and inbuilt reliability of our type G-4 magneto accounts for its wide use.

The Eisemann combination magneto-generator is also a favored instrument where an electrical starting and lighting system is employed.

*Catalogue upon request*



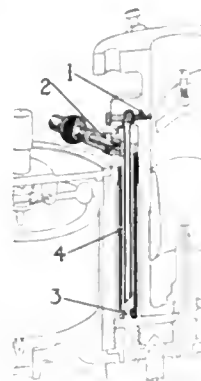
EISEMANN MAGNETO CORPORATION  
BROOKLYN, N. Y.  
DETROIT CHICAGO SAN FRANCISCO



## Easy Starting in Winter

Your drivers need not lose valuable time this winter because of a balky motor—nor need they waste gasoline by leaving the motor running during stops, on account of fear of hard starting.

The Zenith starting and idling device—operating independent of the carburetor proper which controls the mixture in ordinary driving—gives the right mixture for easy starting, impossible from the ordinary carburetor jets because of the small suction at low speed.



## ZENITH

CARBURETOR

This device is inoperative as soon as the throttle is opened and all control is held by the famous compound nozzle, assuring the economy and flexibility for which Zenith carburetors are famous.

Before the severe weather sets in see that your buses are Zenith-equipped—it will mean more revenue this winter, because less lost time.

Any of our 800 stations will fit your buses with the right Zeniths, properly adjusted—once and for all—giving you *Power with Economy*.

If you don't know where the Zenith station in your city is, drop us a line—we'll send a representative to you promptly.

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*Manufacturers of*

### ZENITH CARBURETORS

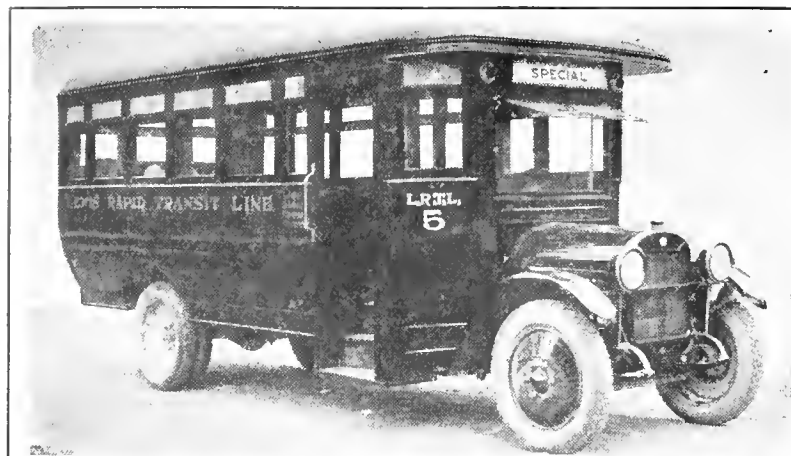
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24-passenger type

A Complete Line

Any Capacity desired

Interurban Coach

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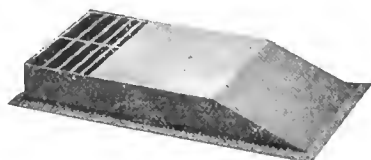
Cross Country Coach (Full cross seat style  
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N-L Bus Ventilator  
Type "CC"

## Have You Received Your Copy Of "Superior Ventilation?"

"Superior Ventilation" describes and illustrates N-L Ventilators adaptable to Motor Buses, Electric Railway Cars, Taxicabs and Closed Cars.

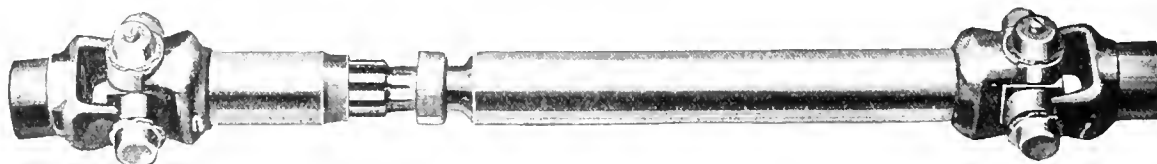
*Adequate Bus Ventilation Is Important*

## THE NICHOLS-LINTERN COMPANY

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N-L Products Manufactured and Sold in Canada by Railway & Power Engineering Corp., Ltd., 133 Eastern Ave., Toronto, Ont.



THE JOINTS HAVE MORE WORKING CAPACITY THAN  
ANY OTHERS THAT WILL SWING IN THE SAME SPACE.

## Blood-Brothers Machine Company

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## The W-S-M Motor

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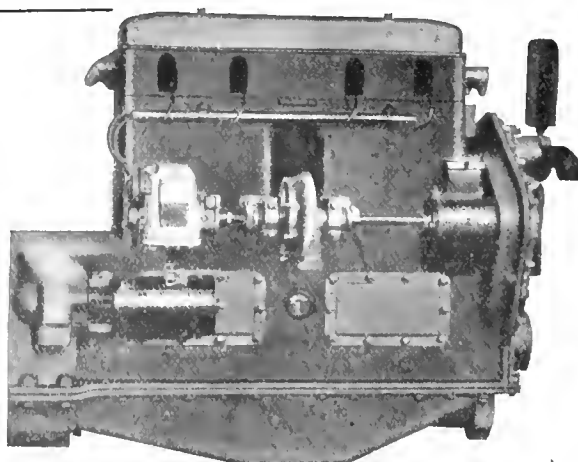
THE TRADEMARK  
THAT ASSURES



DEPENDABLE POWER  
MINIMUM UPKEEP COST

Ask for Bulletin No. 73

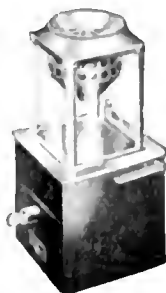
**THE WELLMAN-SEEVER-MORGAN CO.**  
CLEVELAND, OHIO, U. S. A.





## Fare Boxes for Motor Buses

*Simple  
Sturdy  
Compact  
Safe*



Model No. 101B Fare Box  
Takes coins of all denominations and tickets  
Size 24 in x6 in x6 in

Price \$33.00

With small cash drawer reducing height to 18 in. \$25.00.

Ohmer Fare Boxes are strong and compact. There is no delicate mechanism to get out of order.

The entire box, with drawer locked, can be removed and replaced by an empty box as easily as changing containers in other types of closed boxes, which cost twice as much.

Ohmer Fare Boxes are furnished with hanger for one inch pipe or with bracket for attaching to flat surface. In ordering specify which is desired.

**F.O.B.  
Dayton**

Model No. 101A Fare Box  
Takes coins up to and including quarters  
Size 12 in x6 in x6 in

Price \$25.00

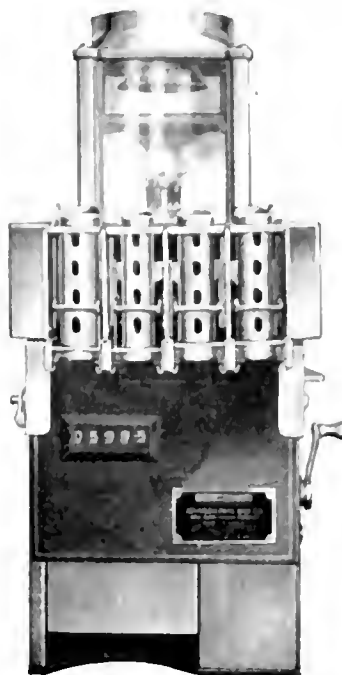
With large cash drawer increasing height to 18 in. \$33.00.

**OHMER FARE REGISTER CO.**

Address Dept. G.

Dayton, Ohio, U. S. A.

## A Sure Combination Fare Box and Changer



Bus operators are finding the arrangement shown a most important piece of equipment.

**Saves Time**

**Increases Earnings**

**Lessens Accident Liability**

**Increases Speed**

**Provides Traffic Figures**

*Write for particulars*

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ARES

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Their

**Safety, Simplicity, Durability and Flexibility**

**Are Realized At A Glance**

*Ask Us for Information About Our Fare Boxes  
Especially Designed for Buses*

**The Cleveland Fare Box Company Cleveland, Ohio**

Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario



Whitfield 28-Passenger Body on White Model 50 Chassis

A man has made a better bus body -

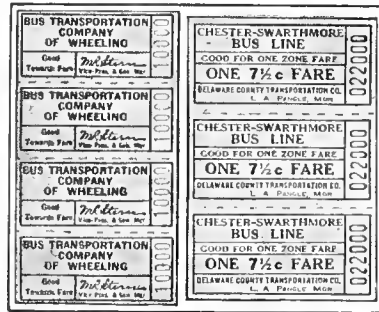
**The WHITFIELD**

*Stronger - at less weight  
Faster - at less cost*

*Fits any chassis*

**W. H. Whitfield  
& Son,**

Penn Yan, N. Y.



## GLOBE

### Tickets—Weekly Passes—Books

And don't forget the Cash Fare Receipt!

If you are not convinced of the value of any of these styles of Globe Tickets—ask us for some detailed information. Many Bus Owners consider them quite indispensable.

Tell us your ticket problems, and let us help you solve them.

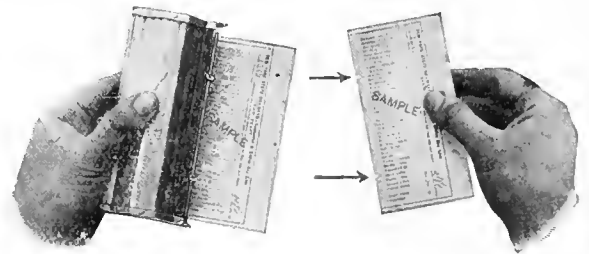
### GLOBE TICKET COMPANY

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**Macdonald**

Here is what two experienced Bus operators think of the Macdonald System.

"Replying to yours of September 5, beg to advise that we tried out several different fare collection systems previous to adopting yours, and we find the Macdonald System the most satisfactory, and is probably the best of its kind on the market."

(Signed) Lyme-New London Bus Line,  
Lyme, Conn.

"We have tried many cash receipt forms on our various bus lines, but found only one really worth while—the Macdonald System."

(Signed) E. J. Dorey, Prop., White Bus Line,  
Binghamton, N. Y.

### The Macdonald Manufacturing Co.

5015 Wellsley Ave., Cleveland, Ohio

### For Motor Bus and Trolley Bus



### BUS SPECIALTIES



ELECTRIC SERVICE SUPPLIES CO.

Philadelphia, 17th and Cambria Sts.; New York, 50 Church St.; Chicago, Monadnock Bldg. Branches: Boston, Scranton, Pittsburgh. Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto.

### High Speed Money Changers

1923 model—  
without rivets  
—ready for  
delivery

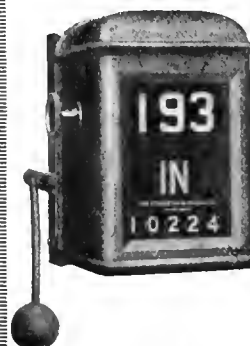


Supplied in one  
or four tube  
Combinations

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Bus Companies because Operators demand it.

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Exclusive Manufacturer's Selling Agent



### The Type R-10 Single International Fare Register

here shown has proved effective in service on a large number of Automobile Buses. The International Fare Registers have been standard on most Electric Railway City Systems in this Country for nearly 25 years. Type R-10 Register is 8½ inches high, 5½ inches wide and of an extreme depth of 7 inches including back, and weighs 17½ pounds. Write for Catalogue.

We are the exclusive Selling Agents for the HEEREN ENAMEL BADGES.

The International Register Company  
13 South Throop St., Chicago, Ill.





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**DOUBLE REDUCTION  
BUS AXLES**  
UNIT CONSTRUCTION—FULL FLOATING  
21 in. Self-Equalizing Brakes  
Track 75 in. Max. Spring Cent. 53 in. Max.  
**HUCK AXLE CORPORATION**  
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## MOTOR BUSES

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**INSURE YOUR PASSENGERS  
AGAINST TANK DANGERS**



25-Passenger Center-Aisle Type

## Niagara Bus Body

A popular standard model

Our central location, our unparalleled facilities for highest quality, our 50,000 sq. ft. of shop space and our guarantee of prompt delivery make this proposition most attractive to bus body buyers.

Let us quote you our lowest price on this increasingly popular model. Estimates furnished on special designs.

*Photographs and full detailed specifications on request*

**NIAGARA MOTOR BOAT COMPANY**

*(Established in 1906)*

250 Sweeney St., North Tonawanda, N. Y.



Type S

### RICO Sanitary Straps For MOTOR BUSES

Our Type S Sanitary Strap is especially adaptable to motor bus requirements. Used by discriminating owners. Durable. Clean. Attractive.

*Write for Bulletin No. 301  
covering our entire line.*

**RAILWAY IMPROVEMENT  
COMPANY**

One Pershing Square, New York City

## To BUS- Truck and Taxi MANUFACTURERS

We know the *Bus* and *Truck* require a spring peculiarly adapted for exacting service.



The *Red Eye* process is a heat-treating method *saving* your troubles at the danger point of every spring. Let us help you stop useless expense.

**THE SAVING SPRING CO.**  
Ashland, Mass.

## Use St. Louis Quality Bus Equipment



No. 10 Driver's Seat

Besides building seats for buses we also manufacture door mechanism, polished bronze trimmings, sash fixtures, ventilators, curtains, etc. Write for Bulletin 10. Prices on seats at rattan quoted on request.

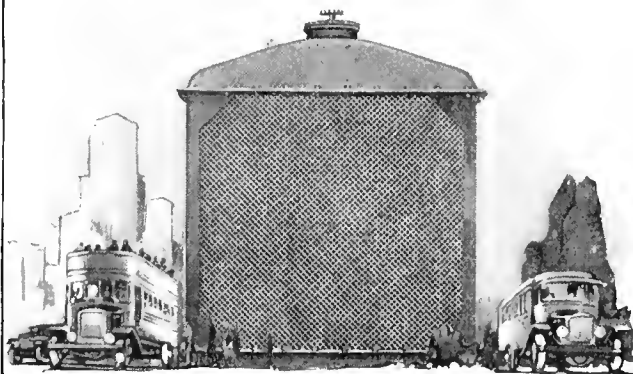


No. 18 Cross Seat

**St. Louis Car Company**  
St. Louis, Mo.

# G & O

## Radiators



## Quality-Strength-Efficiency

G & O Radiators offer not only the most efficient cooling system, but strength and sturdiness so necessary to the gruelling service of bus transportation. G & O Radiators are found on the leading passenger cars and trucks of America. Workmanship, material and design consistent with an international reputation for quality.

*Our Engineering Department Offers  
Prompt and Efficient Co-operation*

**The G & O Mfg. Co.**  
New Haven, Conn.

*"Best for Bus Service"*

## ALPHABETICAL INDEX TO ADVERTISEMENTS

American Car Company .....	71
Armstrong Rubber Company.....	41
Badger & Sons Company, E. B.....	27
Beckwith-Chandler Company .....	30
Bender Body Company .....	70
Bethlehem Steel Company .....	39
Blood-Brothers Machine Company .....	62
Bosch Magneto Company, Robert .....	69
Bower Roller Bearing Company .....	49
Brill Company, The J. G.....	71
Brockway Motor Truck Company.....	20-21
Brown Lipe Gear Company.....	45
Budd Wheel Company .....	26
Bus Body Corporation.....	58
Champion Auto Equipment Company.....	55
Cleveland Fare Box Company .....	63
Cleveland Pneumatic Tool Company.....	35
Clydesdale Motor Truck Company.....	9
Continental Motors Corporation.....	2
Dayton Steel Foundry Company.....	29
Dixon Crucible Company, Joseph.....	60
Duplex Truck Company.....	14
Eberhard Manufacturing Company.....	34
Eckland Bros. Company.....	18
Edwards Company, Inc., The O. M.....	56
Eisemann Magneto Corporation.....	61
Electric Service Supplies Company.....	64
Fageol Motors Company.....	51
Federal Motor Truck Company.....	19
Fifth Avenue Coach Company.....	4-7
Fremont Metal Body Company.....	52
Frink, C. H.....	65
Fulton Company.....	65
G & O Mfg. Company.....	68
Galef, J. L.....	64
Garford Motor Truck Company.....	12
General Electric Company.....	8
Globe Ticket Company.....	64
Goodrich Rubber Company, B. F.....	42
Good Roads Machinery Company.....	31
Goodyear Tire & Rubber Company.....	57
Graham Brothers.....	16
Greenfield Bus Body Company.....	62
Hale-Kilburn Company.....	32
Haskelite Mfg. Company.....	50
Heywood-Wakefield Company.....	59
Hoover Body Company.....	11
Huck Axle Corporation.....	66
Hyatt Roller Bearing Company.....	46
International Motor Company.....	Back Cover
International Register Company, The.....	64
Jackson, Walter.....	69
Janney-Steinmetz & Company.....	66
Johnson Fare Box Company.....	63
Kastory Mfg. Company.....	56
Kuhlman Car Company, G. C.....	71
Lacey, Arthur H.....	69
Lang Body Company.....	55
Leece-Neville Company .....	58
Lee Tire & Rubber Company.....	36

McKay Carriage Company	52
MacDonald Mfg. Company	64
Morton Mfg. Company	60
Morse Chain Company	28

National Paving Brick Mfrs. Assn.	44
Niagara Motor Boat Company	67
Nichols-Lintern Company	62
North East Electric Company	60

Olmer Fare Register Company	63
-----------------------------	----

Parker Pneumatic Bus Seat Company	58
Paterson Vehicle Company	24
Petry Company, Inc., N. A.	54
Princeton Tire & Rubber Company	54

Railway Improvement Company	67
Ross Gear & Tool Company	13

St. Louis Car Company	67
Saving Spring Company	67
Schaefer Wagon Company, The Gustav	22
Schrader's Son, A.	38
Searchlight Section	65
Shuler Axle Company	57
Splindorf Electrical Company	40
Superior Motor Coach Body Company, The	25
Swinehart Tire & Rubber Company	59

Tinken-Detroit Axle Company	43
Transit Equipment Company	17
Traylor Engineering & Manufacturing Company	23

U. S. Rubber Company	15
----------------------	----

Wason Manufacturing Company	71
Waukesha Motor Company	47
Webber, Joseph F.	56
Wellman-Seaver-Morgan Company	62
Westinghouse Air Brake Company	37
Westinghouse Elec. & Mfg. Company	33
White Company, The	10
Whitfield & Son, W. H.	63
Wolff, Daniel	69

Zenith-Detroit Corporation	61
----------------------------	----

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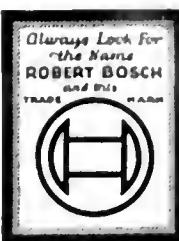
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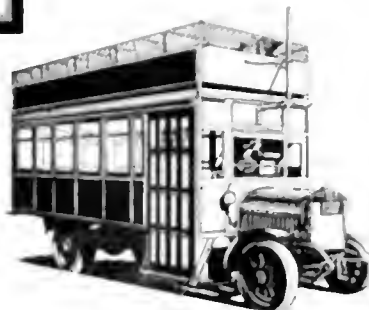
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